PAUL SCHERRER INSTITUT

PSI Scientific Report 2009

Cover photo:
Pallavi Verma (left) and Wolfgang Märkle investigating Lithium-Ion Batteries using a scanning electron microscope.

PSI Scientific Report 2009

PSI Scientific Report 2009

Published by
Paul Scherrer Institute

Editor
Paul Piwnicki

English language editing
Trevor Dury

Coordination
Evelyne Gisler

Design and Layout
Monika Blétry

Photographs
Scanderbeg Sauer Photography
(pages: 1, 4, 6, 18, 19, 88, 100, 106, 114)
All other pictures: PSI

Printing
Sparn Druck + Verlag AG, Möhlin

Available from
Paul Scherrer Institute
Communications Services
5232 Villigen PSI, Switzerland
Phone +41 (0)56 310 21 11
www.psi.ch

PSI public relations
pubrel@psi.ch

Communications officer
Dagmar Baroke

ISSN 1662-1719

Paul Scherrer Institute, April 2010

Table of contents

4 In alliance with the global research community
Foreword from the director

7 SwissFEL

17 Research focus and highlights
18 Synchrotron light
28 Neutrons and muons
36 Particle physics
40 Micro- and nanotechnology
44 Biomolecular research
48 Radiopharmacy
52 Large research facilities
54 Proton therapy
58 General energy
68 CCEM-CH
70 Nuclear energy and safety
82 Environment and energy systems analysis

89 User facilities
90 PSI accelerators
94 Swiss Light Source SLS
96 Spallation Neutron Source SINQ
98 Swiss Muon Source SμS
99 Ultracold Neutron Source

101 Technology transfer

107 Facts and figures
108 PSI in 2009 – an overview
110 Commission and committees
112 Organizational Structure

113 Publications

In alliance with the global research community

Dear Reader,

The three greatest challenges facing our society today are to find a secure, climate-neutral supply of energy, to provide an affordable way of maintaining health for a population that is growing older and older, and to preserve an environment in sound working order to pass on to our descendants.

Scientists around the world are developing novel industrial processes and innovative instruments and materials, as well as new drugs, to help achieve these goals, but we can only purposefully look for innovation if we already have a good fundamental understanding of the underlying processes involved. This is where basic research comes in. For example, we need to understand the processes associated with disease in an organism before we can develop effective drugs to combat it, which have minimal side effects.

However, basic research is not simply a systematic precursor to applied research. It should rather be regarded as a knowledge-oriented, free-ranging form of research, focusing on the sheer acquisition of knowledge. Pure research means following our own curiosity, with the sole aim of contributing to our understanding of the world around us.

At the Paul Scherrer Institute, we carry out both fundamental and applied research. In order to do this, we design, develop, construct and operate world-class, large-scale, complex research facilities, and make them available to the Swiss and international research community. Why?

Many problems in physics, chemistry, biology and the materials sciences can only be solved by carrying out experiments on large-scale research facilities, of a type that cannot be operated by university departments themselves. At PSI, we have three unique, large facilities on the same campus: the SINQ neutron spallation source and the SμS muon source, which are both powered by a proton accelerator, together with the Swiss Light Source SLS. About 2000 researchers from Switzerland and many other countries take the opportunity of carrying out experiments here every year, which is why we also call PSI a “User Laboratory”.

User Laboratory worthy of a Nobel Prize

Venkatraman Ramakrishnan from the MRC Laboratory of Molecular Biology in Cambridge, UK, has been taking measurements regularly at PSI since 2003. Three of the important publications that led the Nobel Prize Committee to award the 2009 Nobel Prize for chemistry to Ramakrishnan – together with two colleagues – were based on measurements he obtained at the SLS, and on experiments at other synchrotron facilities. Ramakrishnan is just one of many who are happy to return repeatedly to PSI. In fact, 1225 applications were made for measurement time in 2009, but only about a half of these could be accepted because of capacity constraints. The quality of the facilities, the variety of techniques on offer and the support provided by our experts are all crucial reasons why scientists choose our establishment.

SwissFEL – an important contribution to Switzerland as a research location

PSI is currently carrying out intensive research into a new large-scale facility. This will be available to scientists from 2016 and will make it possible to carry out hitherto impossible experiments. The large “Swiss X-Ray Free-Electron Laser” project – abbreviated to SwissFEL – will help to secure Switzerland’s future as a world-class research location.

Our specialists are now using the expertise they acquired at the facilities operating today to develop a facility that is techno-

"Swiss universities make intensive use of PSI's large-scale facilities. Long-term, close collaboration based on mutual trust is vital for ensuring that a research activity is a success for both sides."

logically unique and will set new international standards. Scientists at PSI have generated new ideas to make the SwissFEL more compact and more economical than the other three X-ray lasers in the world; of these, one has already been in operation since 2009, in the USA, while the other two – one in Europe and one in Japan – are currently still under construction.

The SwissFEL is a national Swiss facility that is strongly oriented towards the research interests and experiences of the Swiss universities and Swiss industry, and takes into consideration their strategic research plans. Thus, the summary of potential scientific applications of the SwissFEL has been compiled in close collaboration with approximately 25 university research groups. At the same time, PSI is also making an important contribution to the continuing competitiveness of Swiss industry.

Joint professorships with universities

Swiss universities make intensive use of PSI's large-scale facilities. Long-term, close collaboration based on mutual trust is vital for ensuring that a research activity is a success for both sides. Joint university professorships have proved to be one useful instrument for strengthening the framework for such collaboration.

There is a long tradition of PSI staff lecturing at the universities, and we have pursued this form of co-operation even more assiduously since the autumn of 2008. In joint selection panels, we look for ideal candidates from the universities and PSI who are not only performing top-level research and feel at home doing academic teaching, but can also take on the required role of bridge-builder between the universities, PSI and their specific research environment.

At PSI, we act strategically when we select research areas for joint professorships, in that we aim for a close link between important key areas in our own research activities and those of the partner universities. Therefore, in 2009 we appointed and implemented five full, and two associate, professorships with the two Swiss Federal Institutes of Technology (ETH Zurich and EPF Lausanne) and the University of Bern, in the research fields of solid-state physics, particle physics, structural biology, radio chemistry, radiopharmaceutical technology and heterogeneous catalysis.

In 2009, a total of 44 scientists from PSI acted as full, associate or honorary professors, or lecturers. Most of this activity took place at ETHZ and EPFL, but PSI staff also lectured at the Universities of Zurich, Basel, Bern, Geneva, Groningen, Tübingen and Freiburg im Breisgau, as well as at the University of Applied Sciences Northwestern Switzerland. About 40 additional PSI scientists also undertook lecturing assignments at various other institutions of higher education.

Fruitful interaction between universities and research institutes can only be established on a long-term basis if both sides benefit from the co-operation. The high scientific quality of the research performed at PSI is an important argument in favour of collaboration as far as the Swiss Federal Institutes of Technology, the universities and the universities of applied sciences are concerned. Just as important is the fact that the large facilities and methods at PSI complement the research opportunities available in the universities' own laboratories. For PSI, joint professorships offer an opportunity to become more actively integrated into Switzerland's academic system. And through being part of the lecturing structure, the Institute also has a chance of enthusing the best students, at an early stage, in its own research fields, and providing them with systematic support.

If your reading of this Scientific Report has made you want to learn more about us, please visit our new website at: www.psi.ch.

J. Mesot

Professor Dr. Joël Mesot
Director, Paul Scherrer Institute

SwissFEL 7

8 SwissFEL – Project overview and new developments

The next large facility to be built at PSI, an X-ray free-electron laser, has a new name: “SwissFEL”. This replaces the former name, PSI-XFEL, still used in last year’s PSI Scientific Report. The name change has a twofold motivation: firstly, it marks the transition from an R&D-dominated phase to a project preparation phase; and secondly, it emphasizes that this next major research facility, though located at PSI, provides extraordinary research opportunities for the research community all over Switzerland and beyond. SwissFEL is an essential part of PSI’s strategic focus, which will attract top scientists from all over the world and further enhance PSI’s acknowledged position as a world-class research institute.

The project is progressing very well and, based on the SwissFEL Science Workshop Series and with input from the PSI Departments and several review committees, the Scientific Case has now been completed and published. The official designation of this document is *PSI Bericht Nr. 09–10,* and 1200 copies have been printed and widely distributed. The document is also available as a PDF file via the SwissFEL web page: http://fel.web.psi.ch/. The SwissFEL Project was presented to the ETH Board in March 2010, and will be included in the “BFI Botschaft”, to be discussed by the Swiss parliament in 2011. The conceptual design report (CDR) for the accelerator is in preparation and will be completed in April 2010. The project will be realized in 2 phases: Phase 1, a hard X-ray beamline (“Aramis”), will be completed by 2016; and Phase 2, a soft X-ray beamline (“Athos”), will be completed by 2018.

The SwissFEL is prominently represented in the EuroFEL, which links complementary, national FEL facilities into a unique European Research Infrastructure, of which PSI became an official member on 1 April 2009.

◄ **Christopher Gough at the SwissFEL Gun Test Stand.**

Preparations for SwissFEL science

B. D. Patterson, R. Abela, U. Flechsig, B. Pedrini, M. Shalaby and M. van Daalen, *SwissFEL Project, PSI;*
Th. Feurer, *Institute of Applied Physics, University of Bern;* M. Kläui, *Nanomagnetism research group, University of Konstanz, Germany*

The proposed SwissFEL X-ray Laser facility will allow novel investigations of femtosecond molecular dynamics in chemical, biochemical and condensed-matter systems and will permit coherent diffraction imaging of individual nanostructures. A summary of potential scientific applications of the SwissFEL has been compiled in close collaboration with approximately 25 university research groups [1]. In preparation for novel experimental methods at the SwissFEL, simulations are being made of multi-pulse pump/probe experiments, low-statistics X-ray photon correlation spectroscopy measurements and the initiation of magnetization dynamics by terahertz pump pulses.

X-ray Free Electron Lasers (XFEL) will produce ultra-brilliant, ultra-short and highly coherent X-ray pulses, with specifications exceeding those of synchrotron sources by many orders of magnitude. Optimal use of XFEL radiation therefore warrants consideration of novel experimental concepts. Here we report progress on three such concepts: a) multi-pulse pump/probe methods, b) statistical evaluation of X-ray photon correlation spectroscopy (XPCS), and c) triggering magnetic dynamics with pulses of terahertz (THz) radiation.

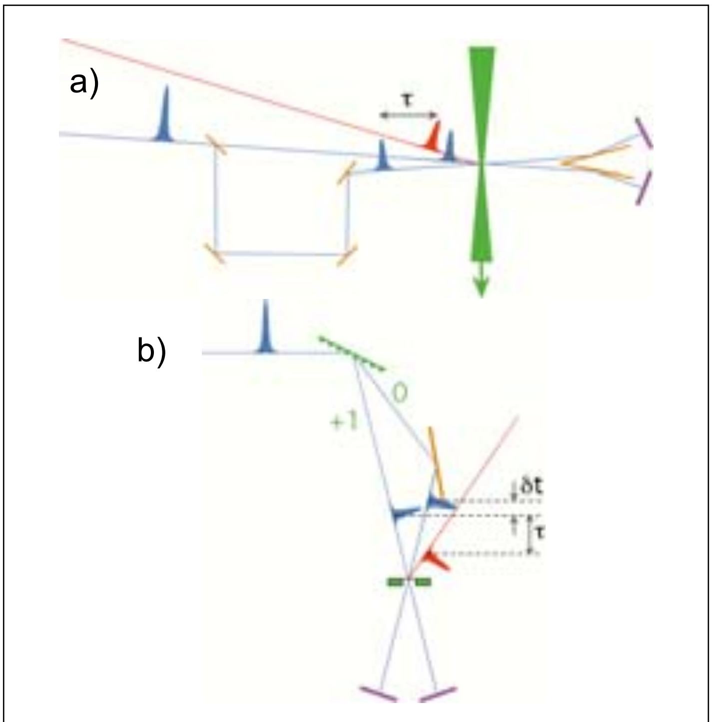


Figure 1: **Two multi-pulse pump/probe methods for the SwissFEL: a) "probe-pump-probe" and b) "pump-probe-probe". The hard X-rays in a) and the soft X-rays in b) are deflected, respectively, by crystals [1] and by a grating/mirror combination.**

Multi-pulse pump/probe experiments

To investigate the dynamics of a physical system, multiple interactions are required. In a simple *pump-probe* experiment, a process such as a chemical reaction or magnetic switching is initiated (for example, by a short laser pulse) and, after a preset time delay, τ, the system is probed (for example, by the absorption or scattering of a SwissFEL X-ray pulse). Repeating identical measurements for different values of τ allows the time-dependent process to be followed. Alternatively, a *probe-probe* measurement of equilibrium fluctuations may be performed using XPCS, as will be discussed below.

Novel *probe-pump-probe* and *pump-probe-probe* methods are schematically shown for hard and soft X-rays in Figures 1a) and b), respectively. The former allows separate, simultaneous measurements of the excited and the unexcited sample, hence reducing the effect of background scattering and shot-to-shot intensity variations, while the latter provides a differential dynamical measurement, over the short delay δt, which is less sensitive to variations in initial conditions.

Simulated split-pulse XPCS

A double-pulse *probe-probe* measurement of the changing coherent diffraction speckle pattern resulting from equilibrium fluctuations (Figure 2a) is called split-pulse XPCS [2].

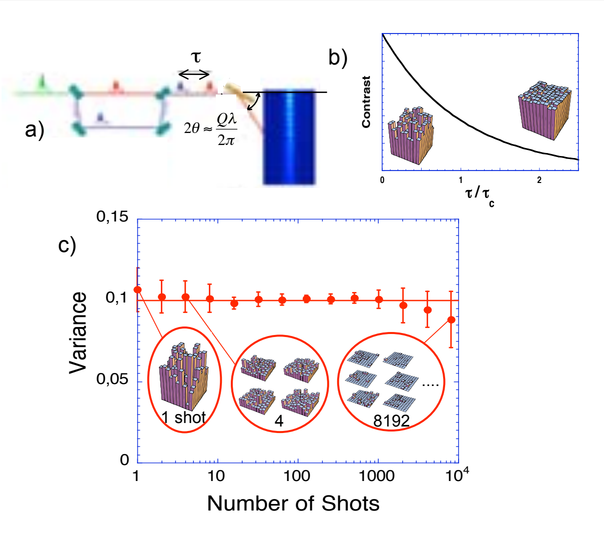


Figure 2: **With split-pulse XPCS (a), the Q-dependent correlation time of a system is determined via the speckle contrast (b). Simulations (c) demonstrate an optimum number of shots and the usefulness of very sparse data.**

Analysis of the doubly-exposed speckle pattern shows a high contrast (large pixel variance) for a delay which is short with respect to the correlation time, τ_c, and low contrast for a long delay (Figure 2b). Because the first pulse may not disturb the sample, the question arises as to how low the exposure level can be to enable useful contrast information to still be extracted.

Figure 2c) shows the result of a simulated experiment in which 10^5 photons are distributed among a number of single-shot measurements of a pre-determined pixel variance (set to 0.1). The surprising discoveries of an intermediate *optimum* number of shots and of useful information retrieval at the level of only 0.1 photons per pixel are encouraging for the future of this technique. It is important to note that measurements which rely on reconstructing unique real-space images from the speckle patterns require much higher single-shot doses.

Magnetization switching with THz

The SwissFEL facility will include a separate, synchronized source of THz radiation [3], to initiate chemical and magnetization dynamics without ionization, for subsequent probing with X-ray pulses. In order to investigate the efficiency of THz magnetic switching, simulations were performed by numerically solving the Landau-Lifshitz-Gilbert equation for magnetic dynamics coupled to the Maxwell equations for the radiation field [4]. The geometry investigated is a thin layer of permalloy, initially magnetized in-plane along the z-direction and irradiated by a THz pulse incident perpendicular to the film (along the y-axis).

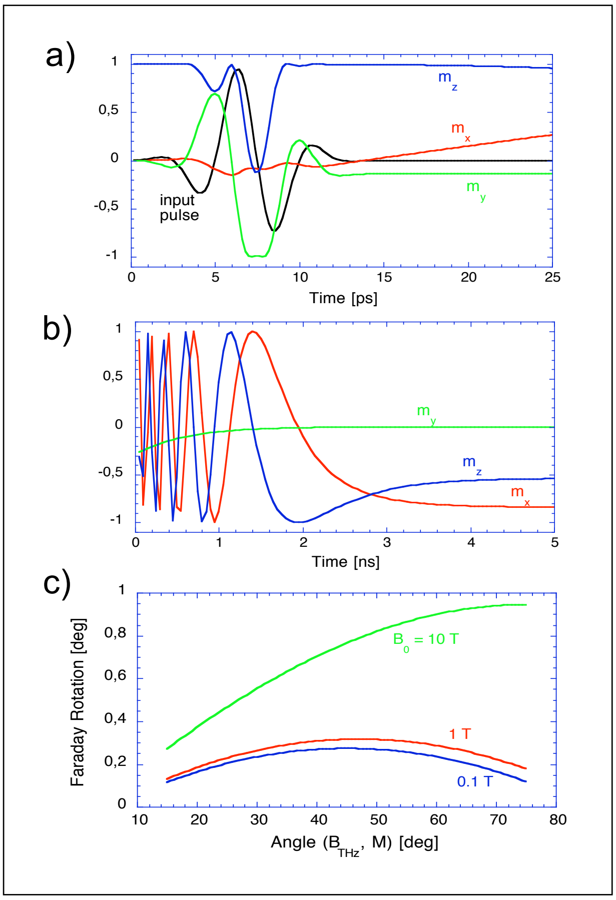


Figure 3: **Simulated magnetic switching induced by a 6 T THz pulse in a permalloy film at short (a) and long (b) times. c): Faraday rotation angles predicted for THz signals of various amplitudes upon transmission by a 600 nm film, as a function of the initial polarization direction.**

In Figures 3a) and b), the switching behaviour is shown for a single-cycle THz pulse, with a maximum field strength B_0 = 6 T, applied along the x-axis. The resulting dynamics show effects during the pulse (Figure 3a) as well as long after the pulse is over (Figure 3b). Switching is found to occur for amplitudes as low as 0.3 T.

It has been suggested [5] that evidence for THz-induced magnetic dynamics may be obtained from an observation of the transmitted THz pulse *itself*. Figure 3c) shows the predicted Faraday rotation angle of THz pulses of various amplitudes after transmission through a 600 nm permalloy film. The abscissa gives the initial polarization direction. Current THz technology should be capable of resolving a Faraday angle of 0.2°.

References

[1] B. D. Patterson, ed., *PSI Bericht 09-10* (2009).
[2] C. Gutt et al., Optics Express **17** 55 (2009).
[3] A. Oppelt et al., FEL-09 Proceedings, Liverpool, UK (2009).
[4] M. Shalaby et al., *in preparation*.
[5] L. Carr, *private communication*.

SwissFEL accelerator

Hans-Heinrich Braun, *on behalf of the SwissFEL design team*

The baseline design of SwissFEL was defined during 2009. It relies on state-of-the-art technologies for all SwissFEL components, thus guaranteeing that construction can start, without major technological risks, as soon as funding becomes available. More advanced options, which may lead to improved performance, are nevertheless being retained and will be integrated once feasibility is proven. A large proportion of the investment for SwissFEL has to be spent on civil engineering. Once the buildings are constructed, however, modifications for later extensions are difficult and costly. Therefore, the whole building concept and building site have been re-considered, adapted to the baseline design and optimized.

The main components of an X-ray free-electron laser are a low-emittance electron injector, a linear accelerator, bunch compressors and magnetic undulators, all of whose functionality was explained in the PSI Scientific Report 2008. In the course of 2009, technical choices for these components were taken to establish a baseline design for the entire SwissFEL facility. These choices rely entirely on state-of-the-art technologies, and therefore no fundamental feasibility issues remain. However, R&D on several more advanced options is still being pursued, namely on field-emitter arrays, pulsed-diode electron guns and FEL seeding. If technical maturity and superior performance compared to the baseline design can be demonstrated, these options can still be integrated in SwissFEL, either during the project preparation phase or as a later upgrade.

An RF gun with metal photo-cathode is used for the baseline design, combining features from the LCLS injector at SLAC and the PHIN RF gun. The latter was developed in the framework of the EU-FP6 EuroTeV consortium, of which PSI was one of the partners. The other parts of the injector, including the first bunch compressor, are described in the following article on the SwissFEL injector test facility.

The main design criteria for the 6 GeV linear accelerator are compactness, investment cost and electrical efficiency. Based on these criteria, a normal conducting pulsed linac has been chosen, working at a repetition frequency of 100 Hz and an RF frequency of 5.7 GHz. This is similar to the SCSS FEL project in Japan, where the linac technology for this frequency band has been pioneered for large-scale installations. SwissFEL will be the first large-scale application of this technology outside Japan. However, based on the experience at SCSS, the system has been further optimized, driven by performance considerations and a cost-of-ownership analysis.

Much effort has been put into the electron beam dynamics, optics and diagnostics. Here, final machine performance and overall compactness were the key criteria. These efforts, together with the choice of linac technology, allowed a substantial reduction to be made in the overall SwissFEL facility length, from the 930 m described in the 2008 PSI Scientific Report to 704 m. In the new baseline design, only two undulator lines remain: ARAMIS, for the 1–7 Å wavelength range, and ATHOS, for the 7–70 Å range. The PORTHOS line, which was still being considered in the 2008 report, has been abandoned for cost reasons. For ARAMIS, an in-vacuum, planar, permanent-magnet undulator operating at room temperature with 15 mm undulator period will be used, while ATHOS employs a permanent-magnet, room temperature, APPLE II-type undulator with 40 mm period length. The latter allows X-rays to be produced in the ATHOS line with full polarization control. The consolidation of a baseline design allowed the overall building layout to be refined and optimised. One of the major modifications made to the layout is to place the technical gallery, with the RF power sources, in a surface building, while the accelerator proper stays in an underground tunnel. Moreover, a new position in the forest of Würenlingen, near to the eastern part of the existing PSI site, has been chosen as the preferred SwissFEL location, after considering optimum machine conditions.

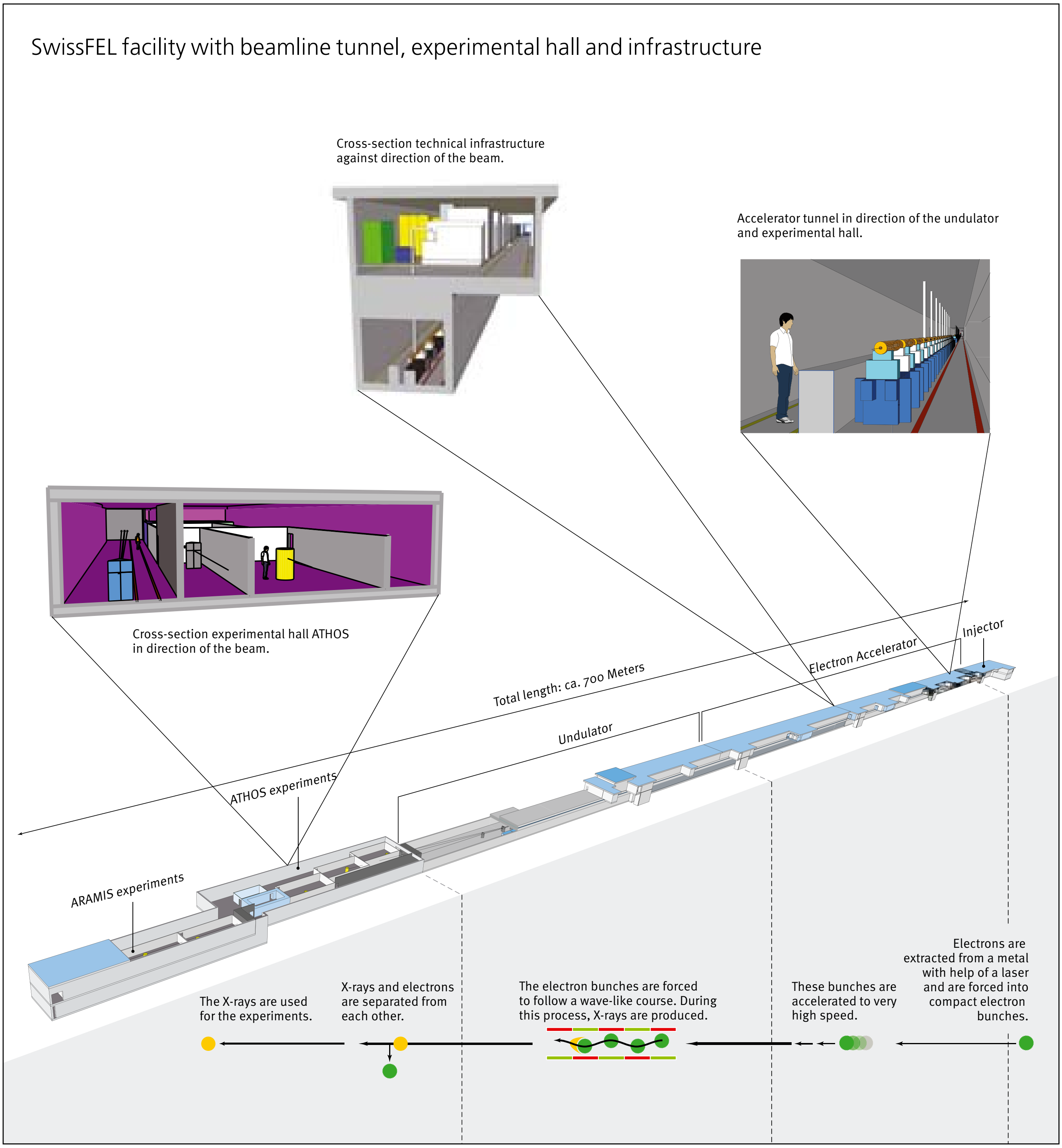


Figure 1: **Schematic drawing of the SwissFEL.**

SwissFEL injector test facility

M. Pedrozzi, H.H. Braun, R. Ganter, C. Hauri, *SwissFEL project, PSI;* V. Arsov, B. Beutner, M. Bopp, A. Citterio, M. Brönnimann, M. Dach, M. Dehler, K. Dreyer, H. Fitze, S. Hunziker , M. Heiniger, R. Ischebeck, T. Lippuner, B. Keil, Y. Kim, M. Negrazus, A. Oppelt, G. Orlandi, J.-Y. Raguin, S. Reiche, S. Sanfilippo, T. Schietinger, T. Schilcher, V. Schlott; L. Schulz, B. Steffen, L. Stingelin , W. Tron, E. Zimoch, J. Wickström, F. Wei, A. Wrulich; *Department of Large Research Facilities (GFA), PSI;* P. Heimgartner R. Künzi; *Logistics Department (LOG), PSI*

The SwissFEL injector test facility is the largest installation at PSI dedicated to beam dynamics studies and R&D activities in support of SwissFEL. The assembly programme started after delivery of the new injector building in April 2009 and will culminate with the commissioning of the linac accelerator in summer 2010. The commissioning programme has three main stages: gun commissioning, starting in January 2010; linac commissioning, starting in summer 2010; and implementation of the compression chicane, in late 2010.

The SwissFEL concept involves a number of sophisticated technologies, requiring a dedicated R&D and prototyping phase preceding the finalization of the design, its industrialization and large series production. With this perspective and according to the SwissFEL baseline design, PSI is presently building a 60 m-long accelerator test facility, reproducing the first acceleration section of SwissFEL [1]. This injector test facility must serve two main purposes: firstly, it provides a tool for verifying experimentally the performance predicted by the simulation codes and consolidating the acceleration concept of SwissFEL; secondly, it will be used as a platform for the development and testing of key components and technologies foreseen for SwissFEL.

A schematic view of the test accelerator is shown in Figure 1. As in the SwissFEL baseline design, the electron source consists of an advanced S-band RF gun with laser-driven photocathode similar to the source used at LCLS [2].Typically the gun will generate 7 MeV electron bunches approximately 10 ps long with a charge of 0.2 nC. The beam radius at emission will lead to a thermal emittance below 0.2 mm.mrad. Enough space in the gun area has, however, been reserved to accommodate possible alternative electron source configurations, such as the Low Emittance Gun presently being investigated at the PSI gun test facility [3].

Four S-band travelling-wave accelerating structures will boost the energy to approximately 250 MeV and generate a time/energy correlation along the electron bunch. Before injection in a magnetic bunch compression chicane, a fourth-harmonic RF cavity is used to linearize the longitudinal phase space for optimal compression. The last 16 m of the beamline are dedicated to the beam characterization of projected and slice beam parameters.

It is foreseen that beam development activities will start by the end of February 2010, with the commissioning of the electron source. The first few metres of the facility together with its technical infrastructure were completed by the end of 2009 (Figure 2). This section of the accelerator determines the electron beam quality for the FEL operation, and for this

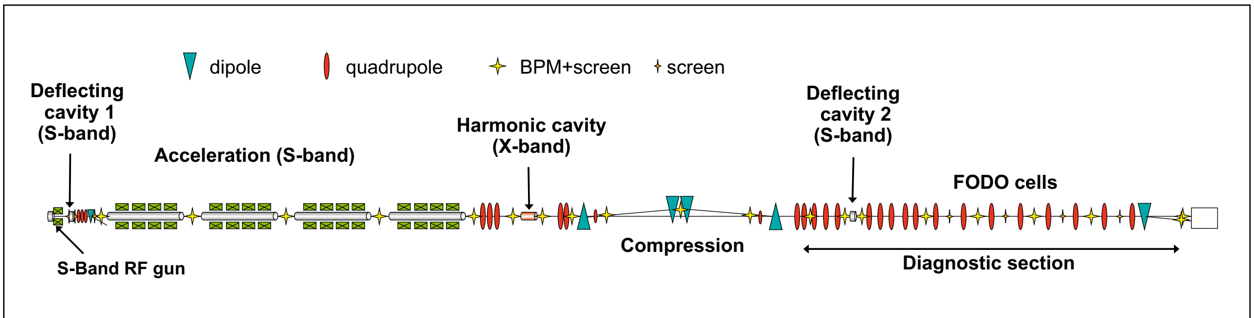


Figure 1: **Schematic of the 250 MeV Injector test facility.**

Figure 2: **Electron source and the first few metres of transport line in the injector tunnel.**

Figure 3: **The accelerator tunnel in the dedicated injector building.**

reason it must be studied carefully to ensure good FEL performance. During gun tests, the assembly of the remaining injector components will continue behind a temporary concrete shield. In summer 2010, the electron source will be connected to the linac to enable the commissioning of the full facility. An extension of the facility, by integrating an undulator line for seeding experiments parallel to the diagnostic section, is presently under evaluation for the 2012 time horizon.

The lattice of the injector test facility was optimized by means of start-to-end simulations [4], to fulfil SwissFEL requirements. The simulated beam parameters after the bunch compression chicane are briefly summarized in Table 1 for high-charge and low-charge modes of operation. These results provide a safety margin, with respect to the maximum specified slice emittances for SwissFEL of more than 25%.

The laser, RF and diagnostic components, timing and synchronization systems, magnets and support systems implemented in the injector facility described in [1] are part of the R&D strategy for SwissFEL. All these components will be tested and improved during the production phase of the test facility. Particularly challenging is the synchronization performance required for stable FEL operation, which demands femtosecond RF stability and corresponding diagnostic capabilities. Essential for the achievement of the required performance is the distribution of an ultra-stable reference signal. In this context, PSI is developing an optical timing distribution system within the test facility program, aiming for time jitters below 10 fs [5].

Parameter	200 pC	10 pC
Energy (MeV)	255	
RMS bunch length (fs)	193	33.2
RMS projected emittance (mm.mrad)	0.38	0.1
RMS slice emittance (mm.mrad)	0.33	0.078
Peak current (A)	352	104

Table 1: **Beam parameters after compression.**

Besides accelerator component development, PSI is acquiring new hardware for the magnetic characterization of the accelerator optics. A measuring system constructed by CERN, using a flux integrating rotating probe (mole) [6], has been on loan to PSI since January 2009 and will soon be purchased. This device has been used to accurately measure the field, gradient strength and high-order harmonics of the injector magnets [7]. Modifications to the test bench are now in preparation, to determine the offset between the geometric and magnetic axes with an accuracy of 50 µm. A refined mole version suitable for the small aperture (∅ > 20 mm) quadrupole foreseen for SwissFEL is presently under development at CERN, to be tested at PSI at the start of 2011.

References

[1] M. Pedrozzi, *250 MeV Injector Test Facility for the SwissFEL Project,* FEL-09 Proceedings, Liverpool, UK (2009).

[2] C. Limborg et al., LCLS TN-05-03 (2005).

[3] R. Ganter et al., FEL-09 Proceedings, Liverpool, UK (2009).

[4] Y. Kim et al., *Start to end simulations of the PSI 250 MeV injector test facility,* EPAC08 Proceedings, Genoa, Italy (2008).

[5] S. Hunziker et al., *Toward an Ultra-Stable Reference Distribution for the Next PSI 250 MeV Injector,* DIPAC09 Proceedings, Basel, Switzerland (2009).

[6] L. Walckiers, *The Harmonic Coil Method,* Proc. of CERN Accelerator School-Magnetic Measurements and Alignment, CERN 92-05 (1992).

[7] S. Sanfilippo et al, *Magnet Design and Testing for the 250 MeV Injector of the SwissFEL at the Paul Scherrer Institute,* Presented at MT21, Hefei, China (2009).

Electron beam characterisation at the SwissFEL gun test facility

R. Ganter, B. Beutner, H.H. Braun, C. Hauri, M. Pedrozzi, A. Trisori, *SwissFEL Project, PSI;* B. Beutner, M. Broennimann, M. Dach, T. Garvey, C. Gough, C. Hauri, R. Ischebeck, S. Ivkovic, E. Kirk, F. Le Pimpec, K. Li, A. Oppelt, M.L. Paraliev, M. Pedrozzi, J.-Y. Raguin, T. Schietinger, T. Schilcher, A. Trisorio, B. Steffen, L. Rivkin, S. Tsujino, and A. Wrulich, *Department of Large Research Facilities, PSI;* E. Kirk, S. Tsujino, *Laboratory for Micro- and Nanotechnology, PSI*

The SwissFEL electron gun test stand has been in operation since January 2009. Although the test programme is still in full swing, several key concepts of SwissFEL have already been successfully demonstrated. In particular the reduction of the intrinsic emittance by laser wavelength tuning has been successfully tested. The nominal beam for low-charge operation of the SwissFEL (10 pC; 0.25 mm.mrad) is routinely obtainable. For high-charge operation (nominal 200 pC; 0.65 mm.mrad) the charge has been obtained, but with a value of around 1.9 mm.mrad the emittance is still too large. This should be overcome once the planned laser pulse time shaping is operational.

The commissioning of an electron gun for the SwissFEL [1] project, providing an electron beam up to 5 MeV beam energy, started in January 2009. The electron gun is a key component of a free-electron laser facility, since the emittance degradation during the first few meters of acceleration usually gives an upper limit on the final beam brightness. The goal of this test stand is thus to gain experience with low-emittance beam generation and characterisation. The electron gun under investigation is a combination of diode acceleration followed by a two-cell RF cavity at 1.5 GHz. The diode is a cathode–anode assembly (see Figure 1) separated by a gap (0 < gap < 30 mm) across which voltage pulses are applied with 200 ns FWHM duration and maximum amplitude of 500 kV. Electrons are extracted from the cathode by photoemission, using laser pulses at different wavelengths in the range from 262 nm to 282 nm [2]. Electrons then leave the diode through a 2 mm-diameter hole in the anode. To prevent large expansion of the beam during the drift between anode and RF cavity (166 mm), an in-vacuum pulsed solenoid is located 51 mm after the anode iris. The two-cell RF cavity [3] is fed with an RF input power of up to 5 MW with 5 μs pulses, corresponding to an accelerating gradient of up to 45 MV/m. The repetition rate is presently limited to 10 Hz. A full diagnostic beamline (scintillating YAG screens, magnets, pinhole masks (pepper-pot), spectrometer arm, etc.) follows the RF cavities and allows measurements of beam emittance, energy spectrum and charge. The ultimate goal of the test stand is to provide electron bunches of 200 pC charge at 5 MeV, with the lowest possible emittance.

Simulations of the installation were performed with ASTRA [4]. At the cathode surface, the beam starts with non-zero emittance — the intrinsic emittance due to the initial photoelectron kinetic energy. Simulation shows that the emittance increases mainly in the diode gap, because of non-linear space-charge effects. In order to partially compensate for this effect, a so-called hollow cathode geometry was used, which provides non-linear electrostatic focusing [5]. To preserve the emittance

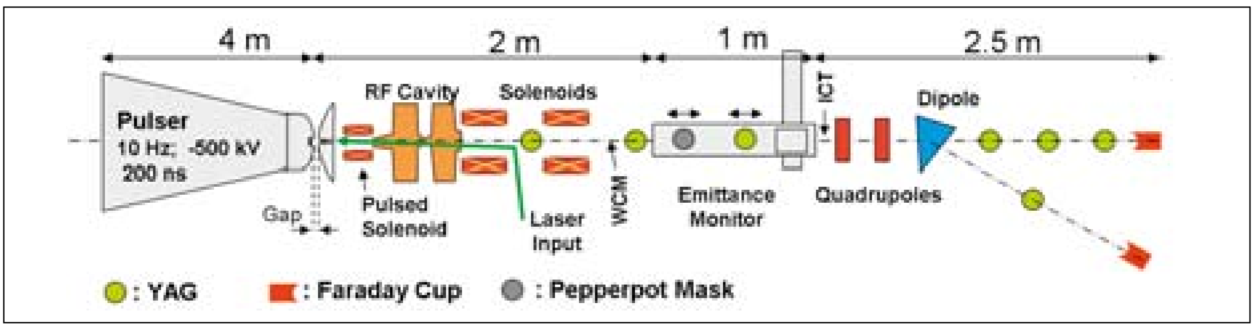


Figure 1: **Schematic of the diode and RF cavity gun test stand installed at PSI.**

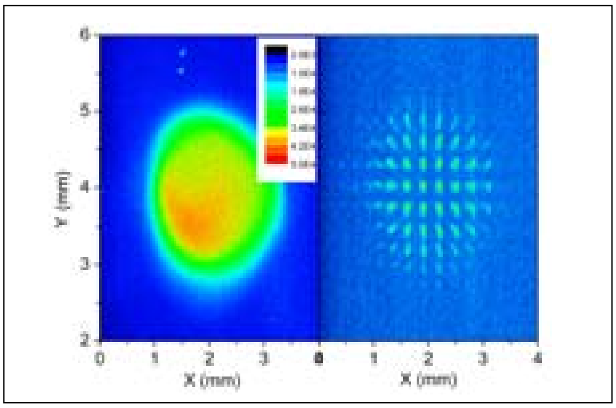


Figure 2: **Measured electron beam transverse profile and corresponding pepper-pot picture (13 pC, 5.1 MeV, 0.23 mm.mrad).**

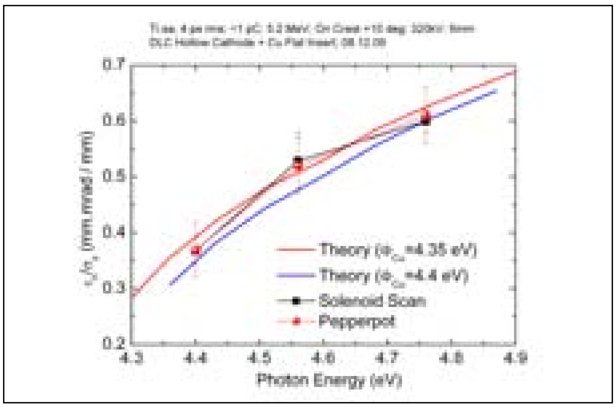


Figure 4: **Intrinsic emittance per mm laser spot size (rms) versus the laser photon energy (Q < 1 pC, 5 MeV, 300 kV, 6 mm).**

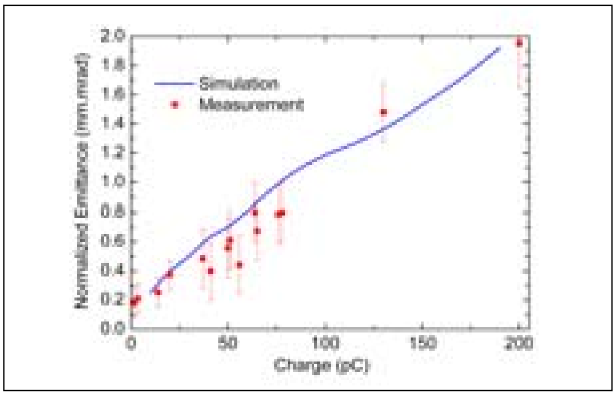


Figure 3: **Normalized projected emittance at 5 MeV (6 mm gap, 300 kV pulser voltage, 6.72 A/mm^2 current density, 4.2 ps (rms) laser duration).**

after the anode iris, it is important to adjust the pulsed solenoid in order to obtain optimum beam conditions at the RF cavity entrance plane (emittance compensation technique) [6]. Figure 2 shows the transverse profile of a typical beam measured at the gun test stand, at 5.1 MeV on a YAG screen. The emissive part of the cathode used here is a flat, hand-polished copper disc. When the pepper-pot array is inserted upstream of the YAG screen, diverging beamlets are clearly observed, from which the projected transverse emittance is obtained. In order to take into account only the core part of the beam, side beamlets, which contribute less than 10% of the total charge, are eliminated.

A comparison between measured emittance and simulated values is presented in Figure 3. Simulations are in good agreement with measurements. The error bars come from the uncertainty in defining the background level and the beam boundaries. The emittance achieved for the nominal 200 pC beam charge is 1.9±0.3 mm.mrad. This value was obtained with laser pulses having a Gaussian time profile of $\sigma_{t,laser}$ = 4.2 ps (rms) duration. From simulations, we expect that the emittance will be reduced to ~1 mm mrad when using a square-shaped laser time profile (0.7 ps rise/fall times and 10 ps duration). According to simulation, an increase of the gradient at the diode (600 kV; 4 mm gap), together with some geometrical modification, should finally bring the emittance down to around 0.4 mm.mrad for 200 pC. This is the goal for the coming months.

In parallel to high-charge operation, important progress was made in the measurement and reduction of the intrinsic beam emittance at the cathode surface (thermal emittance). The intrinsic emittance is the ultimate lower limit in beam emittance that can be obtained for a given cathode material, surface electric field and laser wavelength. The intrinsic emittance is proportional to the laser spot diameter [7]. We have measured this for charges below 1 pC, for different laser spot sizes, to find its dependence on laser spot size (per mm rms) (see Figure 4). Two different techniques (pepperpot and solenoid scan) gave 0.37±0.05 mm.mrad per mm laser spot size (rms) for a laser wavelength of 282 nm incident on a copper cathode (Figure 4). The normalized intrinsic emittance depends only on the difference between the effective work function (defined by cathode material and surface electric field) and the laser photon energy (wavelength).

As shown in Figure 4, the normalized intrinsic emittance decreases with longer laser wavelength. The agreement with theory is good assuming a work function of copper equal to 4.35 eV. The Schottky effect due to the applied electric field (~25 MV/m) reduces the barrier further to around 4.15 eV. The initial kinetic energy of emitted electrons is about 0.25 eV when using 282 nm photons (4.4 eV).

References

[1] B. D. Patterson, *"SwissFEL Science Case"*, Report No. 09-10, PSI, Switzerland (2009).
[2] C. Hauri et al., FEL-09 Proceedings, Liverpool, UK, 2009.
[3] K. Li, Thesis No. 18168, ETH Zurich (2008).
[4] Astra User Manual, http://www.desy.de/mpyflo/Astradokumentation/
[5] R. Ganter et al., FEL-09 Proceedings, Liverpool, UK (2009).
[6] C. Wang et al., Phys. Rev. ST Accel. Beams **10** 104201 (2007).
[7] D. H. Dowell and J. F. Schmerge, PRSTAB **12** 074201 (2009).

Research focus and highlights

18 Synchrotron light
28 Neutrons and muons
36 Particle physics
40 Micro- and nanotechnology
44 Biomolecular research
48 Radiopharmacy
52 Large research facilities
54 Proton therapy
58 General energy
68 CCEM-CH
70 Nuclear energy and safety
82 Environment and energy systems analysis

A selection of research results and developments in scientific research methods is presented in this report. SLS scientists have developed a method for producing high-resolution images of biological tissues and a detector with the world's fastest frame rate. Neutron experiments have shown how an exotic form of ice can incorporate large amounts of salt, while muons have provided new insights into the interplay between magnetism and superconductivity. Tuneable properties, such as resistance, are a feature of materials being developed through research on nanomaterials, and extremely precise measurements of the proton radius have produced a dimension that deviates markedly from the currently accepted value. Research in molecular biology has determined the structure and function of various proteins playing vital roles in living organisms.

In energy research, advances in the use of renewable energies include linking wood gasification with fuel cells as a technology for small-scale heat and power plants, and using solar energy for the production of high-quality gas from carbonaceous waste. Computer modelling is contributing to a better understanding of processes in materials used in nuclear power plants, while a particular example of interdisciplinary research is a new measurement of the half-life of ^{60}Fe, which will lead to a re-evaluation of the development of the early Solar System. Research in environmental science has shown how organic aerosols evolve in the atmosphere.

The new therapy station OPTIS2 for ophthalmological therapy was commissioned at the Center for Proton Therapy, connected to the therapy accelerator COMET and replacing OPTIS, which has treated patients with eye tumours for 25 years. Progress on the Gantry 2 project includes a final concept for the patient positioning system, incorporating an innovative X-ray alignment system.

◀ **PSI scientists Urs Baltensperger (left) and André Prévôt next to the Institute's smog chamber, where processes occurring in the atmosphere are simulated.**

Photons for fun? Much more than that!

J. Friso van der Veen, *Synchrotron Radiation and Nanotechnology Department, PSI, and Department of Physics, ETH Zurich*

Over the years, the Swiss Light Source, SLS, has been developed into a world-leading facility for X-ray research in structural biology, drugs development, biomedical imaging, and nanometre-scale materials characterization. Recently, a programme has been launched in energy and environmental research. Without calling our photons 'green', we do increasingly focus on research themes of immediate relevance in a world with dwindling energy supplies and environmental threats. Surely, photons are fun, as the title suggests, but they are much more than that: one *needs* X-rays for helping to solve today's problems in society and technology.

The SLS has been in operation since 2001. It is an advanced synchrotron radiation facility of the third generation, providing high-brilliance of X-ray radiation to a set of beamlines enabling detailed microscopic studies of matter. Among synchrotron radiation facilities in the medium-energy range, the SLS is internationally a front runner as regards stability of the beam and high brilliance well into the hard X-ray range.

Despite increasing international competition from other sources (e.g. SOLEIL and DIAMOND), research at the SLS remains of exceptionally high standard. Of 330 journal publications in 2009 that are based on research at the SLS, 38 appeared in the top journals Nature, Science, Cell and Physical Review Letters. The discoveries reported in these publications include topics as diverse as the elucidation of the structure

Figure 1: **At the protein-crystallography beamline PXII at the SLS.**

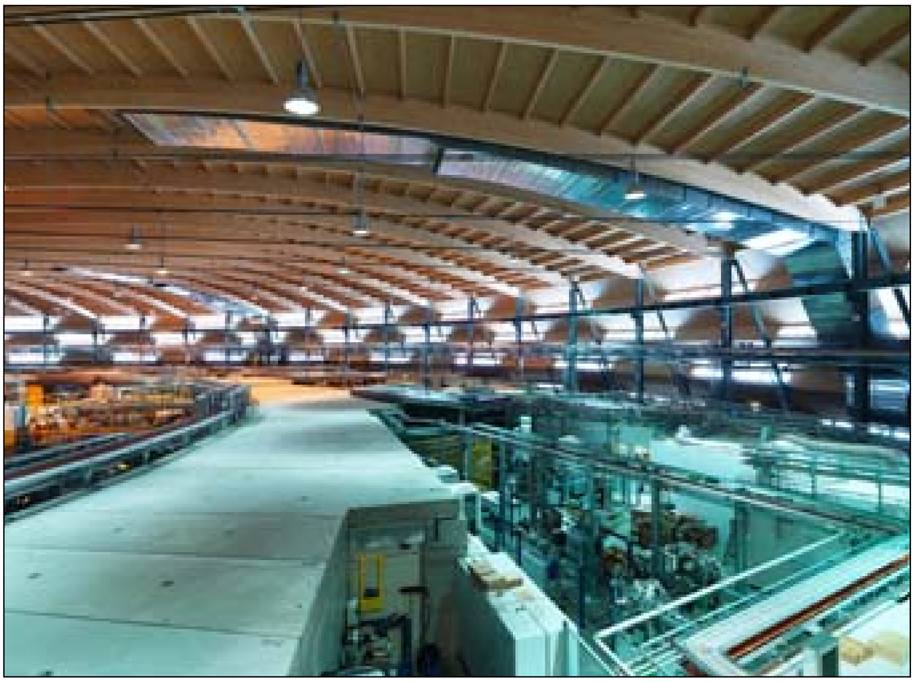


Figure 2: **Inside the SLS experimental hall.**

of the ribosome at high resolution (see below), the nanometre-scale diagnosis of dental caries, understanding the mechanism of the catalytic oxidation of CO in a catalyst under working conditions (important for automotive and fuel cell applications) and even the making of a fast (femtosecond) movie of moving atoms in a solid following a short laser pulse. The research examples presented in this Scientific Report concisely illustrate the interdisciplinary character of synchrotron radiation research, where applications cover essentially all fields in the exact sciences and in engineering. Our unique strengths at PSI lie in the exploitation of synergies between different laboratories and departments. For example, the Laboratory for Micro- and Nanotechnology, being part of the Synchrotron Radiation and Nanotechnology Department, closely collaborates with scientists at the SLS in innovative projects such as phase-contrast X-ray imaging, nanofocusing X-ray optics, pixel detector fabrication, magnetism research, fabrication of field emitter arrays for XFEL applications and infrared spectroscopy. Other examples are our continuous involvement in the SwissFEL project and our recently started activities in energy science jointly with the ENE Department at PSI and with ETH Zurich. More such collaborations within the ETH domain and with other Swiss Universities have been realized or are underway.

One example of research of which the synchrotron radiation community is particularly proud will now be presented. In general, one of the most important activities at a synchrotron radiation facility is X-ray crystallography. This 'established' technique, despite the yawns it occasionally provokes at funding agencies, has outlived all 'fashions' in science. In fact, no other discipline has been awarded with so many Nobel Prizes as crystallographic research. In 2009, we have seen another beautiful example: the Nobel Prize in Chemistry for the 'Structure and Function of the Ribosome', given to Ada Yonath, Thomas Steitz and Venkatraman Ramakrishnan. These structural biologists achieved their breakthroughs thanks to the use of synchrotron radiation for the crystallographic part of their research. In addition to providing detailed insight into translation, these results are directly contributing to the development of new antibiotics. Since 2005, the group of Venki Ramakrishnan has been a regular user of the macromolecular crystallography (MX) beamlines at the SLS. Their first major result was obtaining the structure of the 70S ribosome from *Thermus thermophilus* in a pre-translocation state at a resolution of 2.8 Å, which allowed them to build an accurate model that revealed the structures of tRNA and mRNA in situ, and the molecular details of their interaction with the ribosome. This structure was determined with the highest resolution ever obtained on 70S ribosomes [1]. Their most recent work [2], cited by the Nobel committee, benefited substantially from our PILATUS pixel detector, as well as from the high brilliance and beam stability offered by the SLS. But equally important is the professionalism of the staff running the beamlines. At the SLS, the MX team has become one of the world leaders in providing optimal and reliable conditions for demanding MX on crystals with large unit cells. We congratulate the Nobel Prize winners not only on their major breakthroughs in ribosome research but also for putting synchrotron crystallography again so prominently on the world map of science.

References

[1] M. Selmer et al., Science **313** 1935-1942 (2006).
[2] R.M. Voorhees et al., Nat. Struct. Mol. Biol. **16** 528-533 (2009).

Towards understanding structure-performance relationships in catalysis

Maarten Nachtegaal, Evalyn M.C. Alayon, *Laboratory for Energy and Materials Cycles, PSI;* Jagdeep Singh, Jeroen A. van Bokhoven, *Institute for Chemical and Bioengineering, ETH Zürich;* Jan Stötzel, *Department of Physics, University of Wuppertal, Germany*

The rational design and synthesis of tailored catalysts and catalytic processes requires understanding of structure-performance relationships. These relationships are not readily available due to the demanding experimental conditions at which these catalysts are operated. By combining *in-situ* time- and space-resolved X-ray absorption spectroscopy (to determine the dynamic catalyst structure), mass spectrometry (to determine the performance of the catalyst), and infrared spectroscopy (to establish the surface adsorbates), we have identified how the structure and reactivity of a supported Pt catalyst depend on the local concentration of carbon monoxide (CO) and oxygen during the oscillatory oxidation of CO.

The majority of products which we use in daily life are produced with a catalyst. These catalysts often consist of nano-sized transition-metal particles on a support, to increase the reactive surface area and to decrease the total amount of transition metal used. Most, if not all, of these catalysts have been developed by trial and error. The rational design and synthesis of tailored catalysts and catalytic processes require an understanding of the structure-performance relationship. Determining the structure-performance relationship of nano-sized catalysts under catalytically relevant conditions, i.e. temperatures between 100 and 900 °C and pressures ranging from one to several atmospheres, is one of the challenges in contemporary catalysis research.

The catalytic oxidation of carbon monoxide (CO) is the best-studied reaction in catalysis [1]. This reaction occurs in automotive catalysts and is important in removal of CO from streams of hydrogen in fuel-cell applications. There is consensus that a CO-covered surface shows low activity at low temperature [2]. The active phase at high temperature is highly debated: a reconstructed surface under high vacuum conditions, or a disordered oxide [3] or oxygen-covered surface [4] under atmospheric pressure.

Interestingly, the oxidation of carbon monoxide shows oscillating behaviour under specific conditions. On single crystal surfaces and under high vacuum, the surface structure of the catalyst oscillates between two states that show different activity. The CO surface coverage determines which phase is present [1]. However, oscillations are not limited to vacuum conditions and also occur on technical catalysts under actual catalytic conditions. By uniquely measuring the time- and space-resolved structure-performance relationship, we have identified the origin behind the oscillating reaction under operating conditions (high pressure, supported nano-particle catalysts) and, with it, the catalytically most active phase.

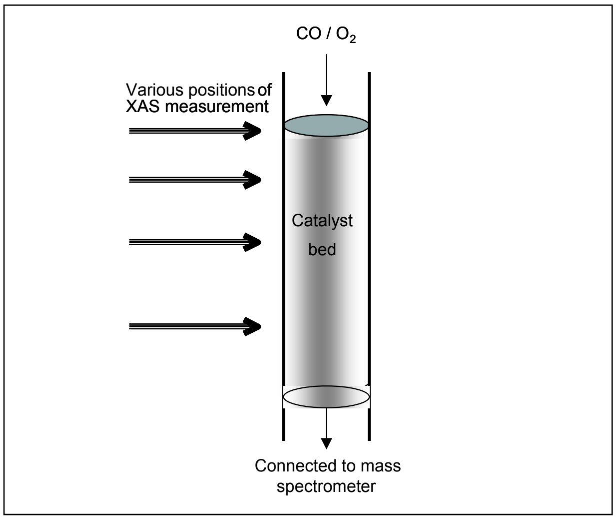


Figure 1: **Plug flow reactor for *in-situ* XAS measurements.**

In-situ XAS measurements

Thanks to the penetration depth of hard X-rays, synchrotron-based X-ray techniques enable the catalyst structure in a reactor to be studied under operating conditions. We have performed space- and time-resolved X-ray absorption spectroscopy (XAS) on the oscillations in the oxidation of CO at

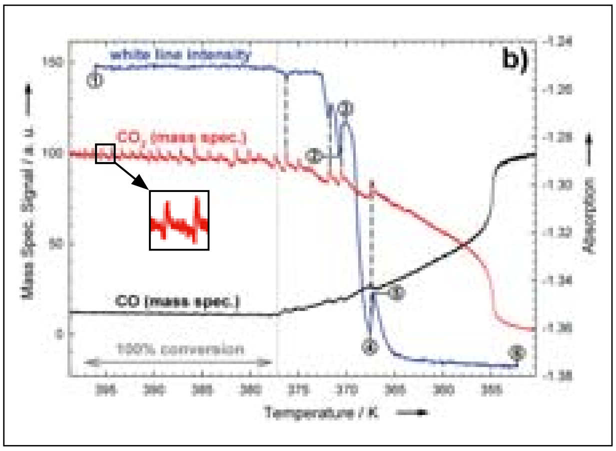


Figure 2: **CO_2 and CO mass spectrometer traces plotted with the Pt L_3 white-line intensity measured in a plug flow reactor during the oscillating oxidation of CO.**

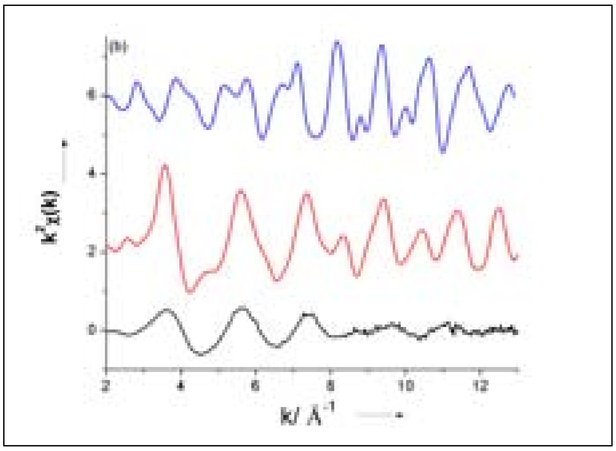


Figure 3: **EXAFS spectra of Pt/Al_2O_3 taken at high activity (black, corresponding to point 1 in Figure 2) together with references of metallic Ru (blue) and Ru oxide (red).**

different positions in a packed-bed reactor (Figure 1). The conversion of CO was achieved by heating reduced Pt particles in a flow of O_2 and CO at a molar ratio of 19:1 to 398 K. At this temperature, full conversion was observed.

Figure 2 shows the traces of CO_2 and CO as detected in the mass spectrometer upon cooling of the plug flow reactor, starting at 398 K. Oscillations in the signal of CO_2 were observed. One oscillation was characterized by a slow decrease in the amount of CO_2 followed by a sharp increase of the signal to a level higher than characteristic of full CO conversion (insert, Figure 2). This can be explained by storage of CO on the catalyst during the decrease of CO_2 production (IR data not shown), which is suddenly released during the sharp rise in CO_2. The moment that the conversion decreased to below 100%, a small increase in CO was observed, coinciding with a minimum in the CO_2 signal. The plotted white-line intensity plotted in Figure 2 is taken from the maximum of the absorption edge of the individual spectra and is indicative of the degree of oxidation. High white-line intensity indicates partly oxidized Pt, whereas low intensity indicates fully reduced Pt [5]. In the initial cooling trajectory, the oscillations (as shown by the mass spectrometer traces) had no effect on the white-line intensity (structure of the catalyst) measured one millimetre below the top of the reactor (Figure 1). When the conversion in CO decreased to below 100%, a decrease in the amount of oxidized platinum was observed until the platinum was fully reduced. The reduction of the oxide is related to the enhanced local concentration of CO, in agreement with earlier observations [3]. On top of this decreasing oxidized platinum signal, an oscillation in the white-line intensity was observed which paralleled the oscillations in the CO_2 signal. Within an oscillation, the decreased amount of CO_2 at the exhaust was paralleled by a reduction of the catalyst. The sharp rise in CO_2 is caused by the fast reaction of chemisorbed CO with oxygen. This frees the surface of the poisoning CO, which enables the catalyst to generate a more active surface to dissociate oxygen. This oxygen can react with CO very quickly or it can further react with the surface and oxidize it. To determine the structure of the partially oxidized and fully reduced CO-covered catalyst, full extended X-ray absorption fine structure (EXAFS) analyses were performed on the individual quick-XAS spectra (Figure 3). In addition to a metal core, the presence of platinum oxide was indicated by Pt-O and Pt-Pt coordination shells located at distances of 1.99 and 3.09 Å, matching those of an oxide. The data are consistent with a metallic core and a shell of disordered platinum oxide. The catalyst at low activity has a Pt-Pt distance of 2.75 Å, which is indicative of bond relaxation of the small platinum particles in the presence of adsorbed CO.

We have thus identified the reduction of the surface oxide, which enables the storage of CO on its surface (confirmed by IR data, not shown), as being responsible for the oscillations. This stored CO is released in sudden ignition, which enables re-oxidation of the surface and caused the spike in CO_2. The reduced surface with chemisorbed CO shows lower activity. This indicates that the amount of surface oxide matches the catalytic activity of the catalyst and is thus responsible for the catalytic conversion in the highly active state.

References

[1] G. Ertl, Angew. Chem. Int. Ed. **47** 3524 (2008).
[2] J. Wintterlin, S. Volkening, T.V.W. Janssens, T. Zambelli, G. Ertl, Science **278** 1934 (1997).
[3] J. Singh et al., Angew. Chem. Int. Ed. **47** 9260 (2008)
[4] M.S. Chen et al.,Surf. Sci. **610** 5236 (2007).
[5] O.V. Safonova et al., Phys. Chem. B **110** 16162 (2006).

EIGER: The fastest single-photon counting detector for the Swiss Light Source

Roberto Dinapoli [b], Beat Henrich [a], Ian Johnson [a], Lukas Schaedler [a], Elmar Schmid [b], Bernd Schmitt [a], Akos Schreiber [b], Dominic Suter [a], Gerd Theidel [b]

[a] *Swiss Light Source (SLS),* [b] *Research with Neutrons and Muons (NUM), PSI*

Detector development has a long and successful tradition at PSI. The know-how that was built up during the design of the tracking pixel detector for the CMS experiment at CERN was put to profit and led to the development of both strip and pixel detectors for the SLS. In fact, the SLS detector group developed and successfully equipped several beamlines with state-of-the-art silicon detectors: MYTHEN is a modularized strip detector (50µm strip pitch) tailored to the needs of powder diffraction; PILATUS is a pixellated detector in use at the Macromolecular Crystallography beamline PXI. These detector systems made many otherwise impossible measurements possible, leading, due to the consequently high demand, to their commercialization by Dectris. At present, a new pixel detector with increased resolution and the world's fastest frame rate is being developed, called EIGER (Extreme hIGh framE Rate detector).

Introduction

The experience of the Nobel Prize winner and SLS facility user Venkatraman Ramakrishnan shows that detector performance is indeed a key element for producing high-quality scientific results. Moreover, the success achieved by the PSI SLS detector group with the development of the MYTHEN [1] and PILATUS [2] detectors has motivated research for a much more advanced family of pixel detectors, EIGER, which addresses several needs highlighted by our user community. In particular, smaller pixels and faster frame rate (possibly with negligible dead time) are considered to be the most crucial specification parameters.

As its predecessors, EIGER is a single-photon counting hybrid detector. This means that the high sensitivity of the readout circuitry allows any single incoming photon to be counted. The sensor and its readout chip are produced separately, and then every sensor pixel is connected via a microscopic indium ball to its corresponding pixel in the readout chip.

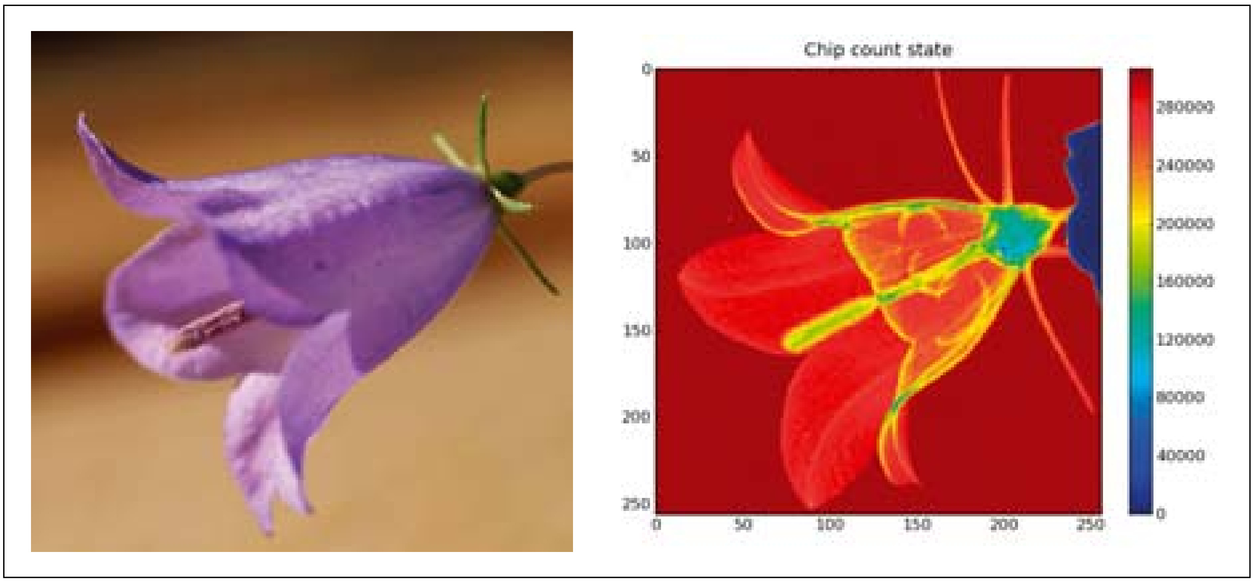


Figure 1: **Original image of a bellflower (Campanula rotundifolia) and its X-ray absorption image (right).**

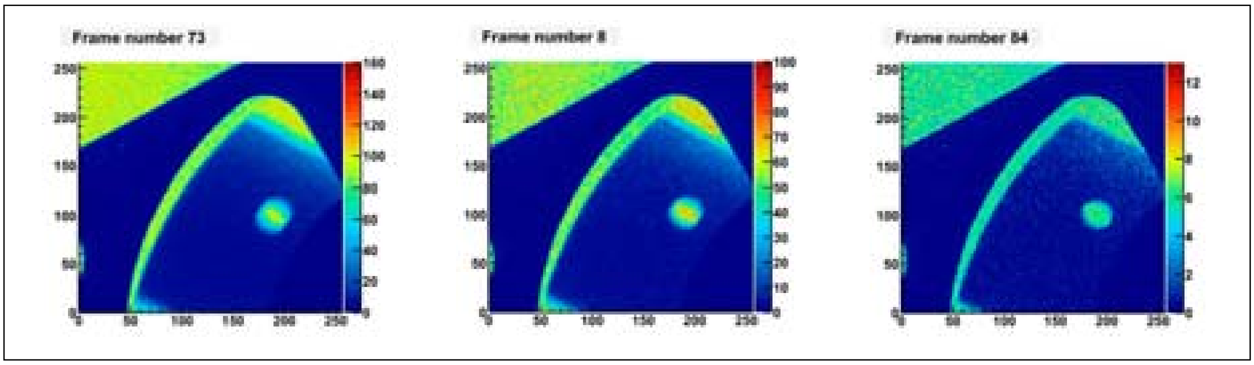


Figure 2: **The blade of a rotating fan (100 Hz) recorded with 12bit counter depth, 125μs exposure time and 7.8kHz frame rate (left); 8bit counter depth, 85μs exposure time and 11.4kHz frame rate (center); and 4bit counter depth, 45μs exposure time and 20.8 kHz frame rate.**

First step: an EIGER single-chip detector

The main shortcomings of the Pilatus detector are the pixel size and the dead time during readout, which limit the readout rate (frame rate). The EIGER detector is in every respect better than its ancestor PILATUS. A smaller pixel increases the image resolution, but also limits the number of transistors, and hence the functionality, that can be put on the pixel itself. With EIGER, the optimum between maximal functionality and minimal pixel size has resulted in 75μm × 75μm pixels. An array of 256 × 256 pixels fits onto a 2cm × 2cm chip [3].

The first test setup, a single chip bump bonded to a monolithic single chip sensor, was commissioned in late August 2009. In parallel, dedicated hardware, firmware and software had to be developed to comply with the enormous data rate the chip is capable of delivering. The entire EIGER system development is a collaboration between the SLS detector group and the NUM electronics and measurement systems group. The result of one of the first tests under X-rays, the absorption by a bellflower *(Campanula rotundifolia),* is shown in Figure 1.

For fast frame rates, the readout time (dead time) is very significant. Many measurements with PILATUS are currently limited by the frame rate, but EIGER has a negligible dead time, allowing high frame rates combined with small pixel size. This is achieved by parallelizing the readout and an operation allowing readout during the acquisition of the next image. Each EIGER chip has 32 parallel readout channels (so-called super-columns) which comprise eight pixel columns. The counts of all pixels in a super-column are sequentially processed in a super-serializer for readout. A compromise of the smaller pixel size was reducing the size of the counter with respect to the PILATUS chip. But this alleged disadvantage is compensated by the continuous read/write mode, where frame summation can be done on the fly in the controlling readout electronics, leading to a practically infinite dynamic range (32 bits). Furthermore, the user will have the choice between different counter depths (4, 8 or 12 bits). Depending on the counter depth, the EIGER can deliver frame rates up to 8kHz (12bit), 12.4kHz (8bit) or 24.4 kHz (4bit). These are currently the highest available frame rates for single-photon counting detectors.

The advantages and drawbacks of the different counter depths can be explained best with reference to the images of Figure 2. The X-ray absorption image of a moving fan is shown, using the three different modes of operation. The left-most image was taken using the maximum counter depth of 12bit, with an exposure time of 125μs. The edges of non-moving parts show good sharpness, while the edges of the moving blade are smeared and the hole in the blade is drawn out. The image on the far right uses the 4bit mode and an exposure time of 45μs. This image appears very coarse-grained, but the moving parts are clearly less blurred. The 8bit mode with an exposure time of 85μs appears to be a compromise between the two extremes. The chip's maximum data rate capabilities were exploited in all images. The data transfer capabilities for the Ethernet data connection were exceeded in all cases, which required on-board memory and a fast memory controller for intermediate data storage. The memory then has to be read out after a series of exposures.

Conclusions

System tests so far have shown that the EIGER system meets its specifications, and in some respects exceeds our expectations. The challenge ahead will be to step up from a single-chip system to a multi-chip module and a multi-module detector. Dealing with the enormous data rate will then be a serious challenge.

References

[1] A. Bergamaschi et al., Nucl. Instr. and Meth. Phys. Res. A **604** 236-239 (2009).

[2] B. Henrich et al., Nucl. Instr. and Meth. Phys. Res. A **607** 247-249 (2009).

[3] R. Dinapoli et al., Nucl. Instr. and Meth. Phys. Res. A, in print, doi:10.1016/j.nima.2009.10.043 (2009).

Scanning SAXS: Bridging the gap between coarse- and nano-scale microscopy

Oliver Bunk[a], Hans Deyhle[a,b,c], Stefan Buser[b,c], Gabriel Krastl[b], Nicola U. Zitzmann[b], Bernd Ilgenstein[b], Andreas Menzel[a], Ana Diaz[a], Franz Pfeiffer[d], Roland Weiger[b], Bert Müller[b,c]
[a] *Synchrotron Radiation and Nanotechnology, PSI, Switzerland;*
[b] *School of Dental Medicine, University of Basel, Basel, Switzerland;*
[c] *Biomaterials Science Center, University of Basel, Basel, Switzerland;*
[d] *Department of Physics (E17), Technical University Munich, Garching, Germany*

To understand the functioning of biological systems such as human beings, animals, and plants, information over a large range of length scales is needed, from the centimetre down to the nanometre range. There are powerful techniques for obtaining an overall picture and others for high-resolution information on small parts of the system. 'Zooming in' or even covering the full length scale with a single technique, however, is hardly possible. 'Scanning SAXS' covers a large range of length scales, as exemplified for human teeth with research aiming at new dental treatments.

Teeth are a marvel. Despite heavy use they may serve us for decades. Dental enamel is the hardest substance in the human body, consisting primarily of the mineral calcium phosphate, arranged in highly ordered micro- and nano-structures. Hard materials are usually brittle, but enamel is stabilized by the underlying dentin. Dentin contains collagen, a flexible and robust material found all over the human body, for example in bones, tendons, and skin. The excellence of this design can best be seen when a tooth is damaged, for example by a carious lesion. Dental fillings do not reproduce the micro- and nano-structure of teeth and thus cannot fully reproduce the stability and function of the original tooth. Healing rather than repairing would be the ideal solution, i.e. re-mineralising the enamel and restoring the original micro- and nano-structure.

Research in this direction faces a problem frequently encountered in biomedical research. For an understanding of biological systems, information at all length scales is required, from the centimetre down to the nanometre range. Techniques such as computer X-ray tomography and optical microscopy produce invaluable overview images, but cannot resolve nanostructures. Other techniques, such as electron microscopy, have unrivalled resolving power, but are limited to small fields of view or even small samples. But are such small sample areas that are investigated with high resolution representative for the whole object? And where exactly in the coarse-scale overview picture does the high-resolution information need to be obtained? To answer these questions, a technique is required that images nano-scale properties over extended areas.

PSI detector technology and large-scale facilities make a difference

Small-angle X-ray scattering (SAXS) is sensitive to nano-scale structure. But rather than producing an image, the information is averaged over the entire illuminated sample volume and

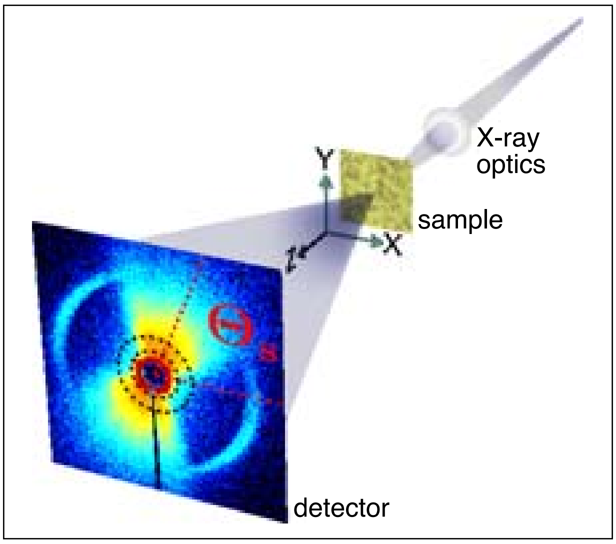


Figure 1: **The experimental setup for scanning SAXS measurements. The sample is raster scanned through the focused X-ray beam and SAXS data are recorded at each point for the currently illuminated sample area. Θ_s reveals the orientation of the illuminated nanostructure. A typical measurement comprises several tens of thousands of SAXS data frames recorded within half an hour.**

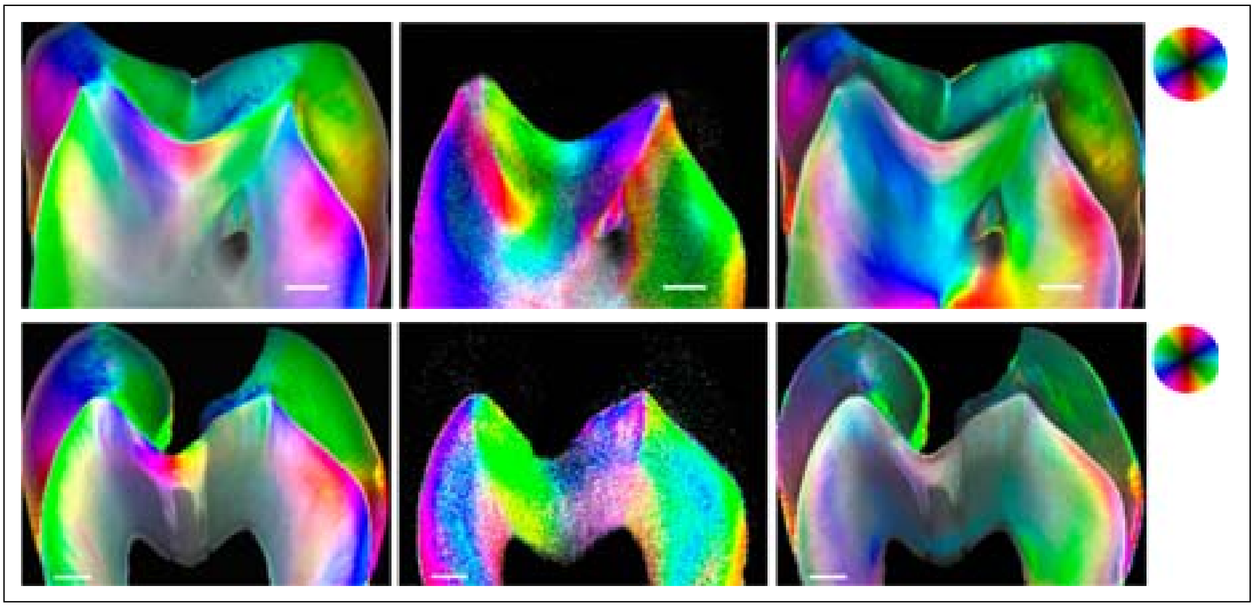


Figure 2: **Nanostructures in a section of a healthy (top row) and a carious (bottom row) human tooth. The orientation of the nano structures is represented by the colour according to the colour-disk legend on the right. The local density of the nanostructures is represented by the saturation of the colour. Nanostructures without preferential orientation show up in gray. Different information derived from a single measurement is shown in each row. In the left column, nanostructures in the range 24–39 nm are depicted, in the centre column collagen-like material of 53–71 nm, and in the right column 185–231 nm. The scale bar in each image is 1 mm long. Fillings used in current dentistry do not reproduce the natural nanostructure at all, which has drawbacks on the lifetime and performance of the repaired tooth. Ideally, the original, natural nanostructure should be restored and the tooth thereby healed rather than repaired.**

provided as reciprocal space data. A way to extend SAXS measurements to imaging is scanning SAXS: raster scanning a sample through a small X-ray beam and recording SAXS data for each illuminated area. Such measurements are a technological challenge, since one image typically requires several tens of thousands of individual measurements that need to be performed and analysed on a reasonable time-scale. A prerequisite is high X-ray flux over a small focal spot in combination with a fast X-ray detector with large dynamic range and low noise, as is suitable hard- and software for coping with the large amounts of data. At PSI, this combination is available due to the excellence of on-site research and technology. The Swiss Light Source provides stable and brilliant X-ray beams. At the cSAXS beamline, a large portion of the flux is focused onto a spot of about 20 µm × 5 µm. While the sample is moved continuously through the X-ray beam, the PILATUS detector developed at PSI records SAXS data at a typical frame rate of the order of 50 Hz. A typical measurement is performed in about half an hour and comprises several tens of gigabytes of data. A sketch of the experimental setup is shown in Figure 1 and resulting images shown in Figure 2 for a healthy and a carious tooth. Such data provide the basis for a better understanding of the functioning of teeth and for the development of remineralization techniques to restore the natural micro- and nano-structure, rather than repairing it with artificial, less-perfect materials.

Applications in several fields

Currently, scanning SAXS is mainly used for biomedical research and materials science applications. However, a wider range of applications is anticipated for this newly emerging technique in the future.

References

[1] O. Bunk, M. Bech, T.H. Jensen, R. Feidenhans'l, T. Binderup, A. Menzel, F. Pfeiffer, *Multimodal X-ray scatter imaging,* New J. Phys. **11** 123016 (2009).

[2] H. Deyhle, O. Bunk, S. Buser, G. Krastl, N.U. Zitzmann, B. Ilgenstein, F. Beckmann, F. Pfeiffer, R. Weiger, B. Müller, *Bio-inspired dental fillings,* in Biomimetics and Bioinspiration, edited by R.J. Martín-Palma; and A. Lakhtakia, Proceedings of the SPIE **7401** 74010E (2009).

Dispersion of magnetic excitations in a spin ladder using Resonant Inelastic X-ray Scattering

Thorsten Schmitt, Justine Schlappa, Vladimir N. Strocov, Luc Patthey, *Laboratory for Synchrotron Radiation – Condensed Matter, PSI;* Francois Vernay, Bernard Delley, *Condensed Matter Theory Group, NUM, PSI;* Henrik M. Rønnow, Xiaoqiang Wang, *EPFL, Lausanne;* Vita Ilakovac, *Université Pierre et Marie Curie, Paris, France;* Andrea Piazzalunga, Lucio Braicovich, Giacomo Ghiringhelli, *Politecnico di Milano, Italy;* Benjamin Thielemann, *Laboratory for Neutron Scattering ETHZ and PSI;* Joël Mesot, *EPFL, ETHZ and PSI*

Collective excitations define the basic transport properties of all materials and are characterised by their dispersion behaviour. The photon-in/photon-out spectroscopy known as Resonant Inelastic X-ray Scattering (RIXS) efficiently probes valence excitations in correlated materials. Instrumentation at the ADRESS beamline of the SLS allows the localization dynamics of such excitations to be assessed by varying the scattering geometry between incident and inelastically scattered X-rays. The momentum transfer dispersion of magnetic excitations in the spin-ladder compound $Sr_{14}Cu_{24}O_{41}$ has been investigated using this technique, demonstrating that the RIXS cross-section changes only moderately over the Brillouin Zone, giving complementary information to Inelastic Neutron Scattering.

Collective excitations in strongly correlated electron materials remain a pivotal challenge in contemporary solid-state physics. It is widely debated whether magnetic excitations provide the pairing interaction in high-temperature and unconventional superconductors. While cuprate superconductors exhibit enormous complexity, the two-leg spin ladder is easier to treat theoretically. It consists of two parallel chains (legs) with transverse (rung) exchange coupling. This system features a singlet ground-state and dispersive triplet excitations – so called triplons. As a result of instrument improvements [1], the technique of Resonant Inelastic X-ray Scattering (RIXS) [2] is gaining vastly in importance in studies of low-energy solid-state phenomena, such as magnetic excitations. Recently, momentum transfer dispersive magnetic excitations have been investigated successfully in long-range ordered antiferromagnets with hard and soft X-ray RIXS [3]. At the ADRESS beamline of the SLS, the two-leg quantum spin ladder $Sr_{14}Cu_{24}O_{41}$ has been studied by means of momentum-resolved high-resolution RIXS at the Cu L_3 edge [4].

Figure 1: **SAXES RIXS spectrometer at the ADRESS beamline.**

Momentum transfer dependent RIXS

The RIXS experiments were performed at the Advanced Resonant Spectroscopies (ADRESS) beamline at the SLS [1b], currently the best facility for this experimental technique, using the Super-Advanced X-ray Emission Spectrometer (SAXES) [1a] (depicted in Figure 1), with a total resolution of better than 120 meV at the Cu L_3 edge. RIXS is a photon-in/photon-out spectroscopic method which measures the energy transfer to the electronic system between incident and inelastically scattered X-ray photons. The momentum transfer $\mathbf{q} = \mathbf{k'} - \mathbf{k}$ ($\mathbf{k'}$ and $\mathbf{k}$ denote the wave vectors of scattered and incident X-ray light, respectively) to the eletronic system can be varied in such an experiment by varying the scattering geometry between incident and detected X-rays. This can be accomplished by rotating the set-up supported by air-cushion devices below the spectrometer platform.

Dispersion of magnetic excitations

Figure 2 displays the low-energy transfer region of RIXS spectra on $Sr_{14}Cu_{24}O_{41}$ for different momentum transfer along the ladder leg direction. For excitations close to the Cu L_3 absorption resonance, two peaks arise in all RIXS spectra. A peak around zero energy loss contains the elastic signal plus unresolved low-energy contributions from phonons and, presumably, magnetic excitations from the chains. The second peak occurs at finite energy loss in the range of the intra-ladder exchange coupling. The latter peak originates from two-triplon magnetic excitations [5] and shows dispersion upon $\mathbf{q}_c$, the momentum transfer along the leg direction.

In Figure 3, a RIXS intensity map is displayed versus momentum and energy transfer. The magnetic two-triplon modes appear here as a broad line, which disperses around the $\mathbf{q}_c$=0 symmetry point. At $\mathbf{q}_c$=0, the line almost merges with the elastic peak and moves with larger $\mathbf{q}_c$ towards higher energy losses. It reaches a maximum of about 320 meV close to $\mathbf{q}_c = 0.3 \times 2\pi/\mathbf{c}_L$, where it then folds back. At the same time, the width of the detected magnetic modes increases considerably towards the edges of the Brillouin zone (BZ). While the Inelastic Neutron Scattering (INS) cross-section is inherently small around the BZ centre (small momentum transfer) [6], the observed RIXS signal is found to be intense all over the BZ.

In summary, in the work presented here, RIXS has been demonstrated to be capable of probing the magnetic fluctuations in spin-liquid quantum ground states and to be complementary to INS [4] in accessible energy as well as momentum transfer range. Further details of this study can be found in Reference 4.

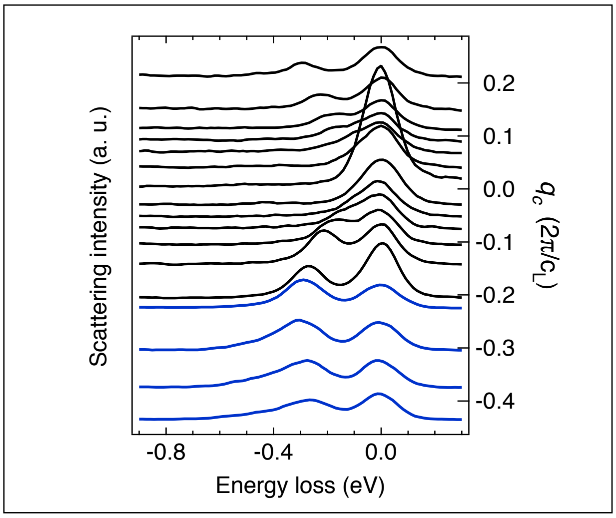


Figure 2: **Dispersion of two-triplon magnetic excitations in Cu L_3 RIXS.**

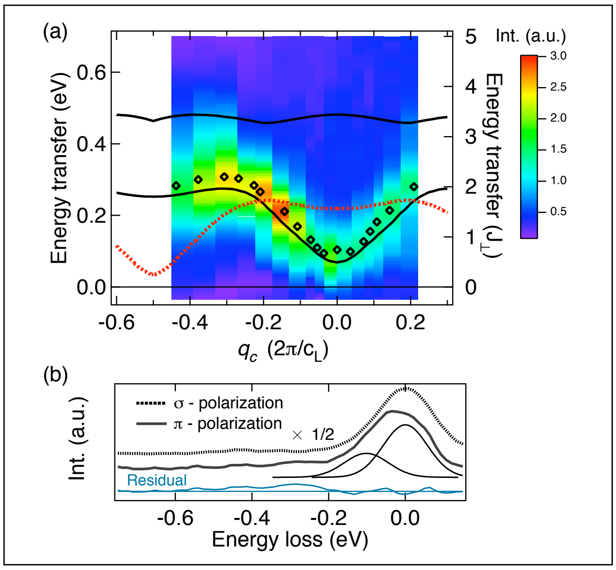


Figure 3: **(a) RIXS data as intensity map vs. momentum and energy transfer. Calculated one-triplon (red dashed line) dispersion curve as well as the lower and upper border of the two-triplon continuum (black full lines) [5] are given for comparison.**
(b) RIXS spectra measured close to BZ centre for both linear polarizations. The π polarized spectrum can be fitted with two Gaussians; the residual is represented by the thin blue line.

References

[1] G. Ghiringhelli et al., Rev. Sci. Instrum. **77** 113108 (2006); V. N. Strocov et al., http://sls.web.psi.ch/view.php/beamlines/adress/index.html

[2] A. Kotani, S. Shin, Rev. Mod. Phys. **73** 203 (2001).

[3] J. P. Hill et al., Phys. Rev. Lett. **100** 097001 (2008); L. Braicovich et al., Phys. Rev. Lett. **102** 167401 (2009).

[4] J. Schlappa et al., Phys. Rev. Lett. **103** 047401 (2009).

[5] K. P. Schmidt, G. S. Uhrig, Mod. Phys. Lett. B **19** 1179 (2005).

[6] S. Notbohm et al., Phys. Rev. Lett. **98** 027403 (2007).

Field-tuned quantum fluctuations in a two-dimensional ordered antiferromagnet

Nikolay Tsyrulin, *Laboratory for Neutron Scattering, PSI and ETH Zurich;* Michel Kenzelmann, *Laboratory for Developments and Methods, PSI;* Tom Pardini, Rajiv Singh, *University of California, Davis, USA;* F. Xiao, Christopher Landee, Mark Turnbull, *Clark University, Worcester, USA;* Peter Link, Astrid Schneidewind, *FRMII Garching, Germany;* Arno Hiess, *ILL Grenoble, France*

Magnetism in materials only exists because of quantum mechanics. In most materials, however, quantum fluctuations are suppressed and magnetism is perceived as a classical phenomenon. Nevertheless, quantum physics is important in frustrated and low-dimensional magnetism, leading to exotic and potentially useful properties in insulators and metals. We have experimentally quantified quantum fluctuations in an ordered, two-dimensional magnetic insulator and demonstrated that they can be tuned with magnetic fields. This is a fascinating example of the co-existence of frozen and dynamic quantum spin degrees of freedom.

Magnetism in condensed matter arises from the electron spin and from the electronic orbitals, both of which are of quantum mechanical origin, and therefore quantized. For localized electrons, they result in single-ion magnetic moments that are a composite of electron and orbital magnetic moment.

In magnetic insulators, such localized magnetic moments interact mostly via the exchange of electrons, leading to an effective magnetic interaction between localized magnetic moments. In most of these materials, such interactions favour anti-parallel alignment of the interacting moments.

Interacting magnetic moments can lead to a static magnetic structure for temperatures that are below the energy scale of the dominant magnetic interactions. This was predicted by Néel in the 1930s and then observed with neutron scattering in the early days of research reactors. The order arises from magnetic mean fields that are generated by neighbours, and that restrict the quantum degree of freedom on a single site, leading to spontaneous symmetry breaking and a long-range magnetic order.

However, some materials develop relatively weak mean fields, and the quantum nature of the magnetism moments is preserved to temperatures well below those where magnetic order is usually expected. This can happen for magnetic materials with low-dimensional or frustrated interaction topologies, where quantum fluctuations are strong and the number of nearest neighbours small. In some materials, magnetic order is completely avoided due to spin correlations that lead to quantum states with macroscopic coherence.

Quantum fluctuations in low dimensions

Some of the best examples of macroscopic quantum magnets can indeed be found in low-dimensional, particularly in one-dimensional, antiferromagnets. A case in point is the antiferromagnetic chain that is quantum critical at zero temperature and features deconfined spinon excitations for S=1/2 [1], but a spin liquid with gapped triplet excitations for S=1 [2].

In two dimensions, quantum effects are generally reduced and the ground state of the S=1/2 square lattice Heisenberg antiferromagnet is long-range ordered at zero temperature. However, quantum fluctuations are not completely suppressed and lead to a reduced ordered moment. In addition, the magnetic excitations – long-lived and long-wave-length spin waves – acquire a quantum renormalized energy scale. The short-length spin waves even experience a dispersion that is not expected in the absence of quantum fluctuations and arises from short-range quantum fluctuations between nearest neighbours [3, 4].

Frustration enhanced quantum fluctuations

We have investigated deuterated single crystals of the organometallic insulator $Cu(pz)_2(ClO_4)_2$ containing well-isolated Cu^{2+} planes [5]. Each Cu^{2+} ion in $Cu(pz)_2(ClO_4)_2$ carries S=1/2 and is surrounded by two pairs of identical cis pyrazine molecules, creating a two-dimensional square array of copper atoms linked by pyrazine molecules in the *bc* plane (Figure 1). From the temperature dependence of the magnetic susceptibility,

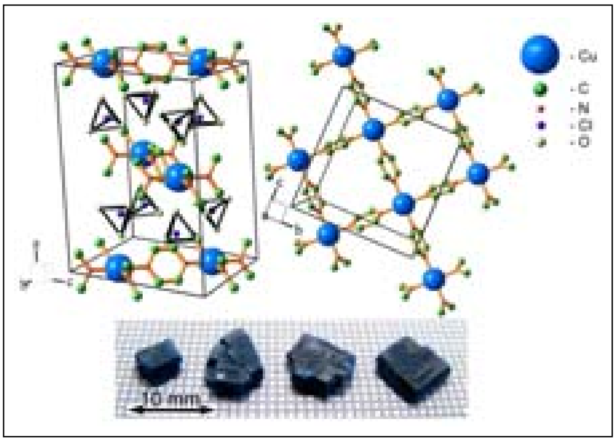


Figure 1: **Crystal structure of $Cu(pz)_2(ClO_4)_2$ in a three-dimensional representation, and the projection onto the bc plane. The photograph shows the quality and size of the single crystals used in the experiments.**

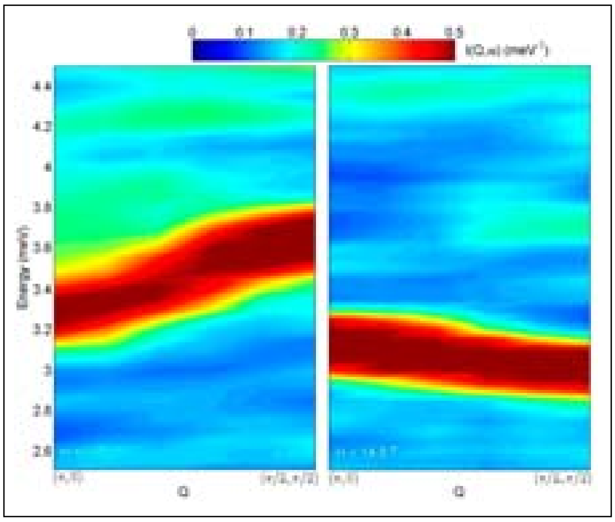


Figure 2: **Zone-boundary excitations, showing a dispersing long-lived excitation and a continuum for wave-vectors (π,0) in $Cu(pz)_2(ClO_4)_2$. (π,0) corresponds to wave-vectors along the square edges, while (π/2,π/2) to diagonal wave-vectors.**

it was concluded that $Cu(pz)_2(ClO_4)_2$ represents a S=1/2 2D square lattice antiferromagnet with nearest-neighbour exchange J=1.53(8) meV and a saturation field of H_{sat} ~ 45 T. Due to small interplane interactions, $Cu(pz)_2(ClO_4)_2$ adopts antiferromagnetic order below T_N=4.2 K.

Using inelastic neutron scattering, we have measured the long-lived spin waves at zero field. At the zone boundary, where the spin waves have a relatively short length scale, we observed a dispersion that reveals the presence of short-range quantum fluctuations (Figure 2a). However, the dispersion is larger than that expected for an S=1/2 square-lattice antiferromagnet with only nearest-neighbour exchange interactions. In addition, we found a relatively strong continuum of excitations above the well-defined excitations for wave-vectors (π,0). The dispersion can be explained by the presence of weak next-nearest neighbour interactions, which act as a small competing interaction and increase quantum fluctuations. This leads to a larger quantum-induced dispersion and also to an increase of continuum excitations.

Field-tuned quantum fluctuations

We applied magnetic fields nearly perpendicular to the square lattice planes and mapped the excitations as a function of magnetic field. At a field of H = 14.9 T, which is equal to one-third of the saturation field, we observed an inversion of the zone-boundary dispersion and a suppression of most of the continuum of excitations. Our series expansion calculations show that the inversion of the zone boundary dispersion only occurs for sufficiently small next-nearest neighbour interactions, of the order of 2% of the dominant exchange interactions.

Our study shows that we can tune quantum fluctuations in an ordered antiferromagnet. While this is a coupling to an externally applied magnetic field, similar fluctuations in materials with mobile electrons, such as unconventional superconductors, may similarly couple to charge degrees of freedom and may be responsible for the intriguing properties in these fascinating materials.

References:

[1] L.D. Faddeev, L.A Takhtajan, Phys. Lett. **85** 375 (1981).
[2] F.D.M. Haldane, Phys. Rev. Lett. **50** 1153 (1983).
[3] A.W. Sandvik, R.R.P. Singh, Phys. Rev. Lett. **86** 528 (2001).
[4] H.M. Ronnow et al., Phys. Rev. Lett. **87** 037202 (2001)
[5] N. Tsyrulin et al., Phys. Rev. Lett. **102** 197201 (2009).

On the way to roots: The journey of water across the soil-plant system

Andrea Carminati, Ahmad B. Moradi, *Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany* and Peter Vontobel, *Spallation Neutron Source, PSI, Switzerland*

How does water enter the roots of plants? Existing models of root water-uptake predict a decrease of water nearer the roots, with water moving from wetter (far away from the root surface) to dryer (adjacent to root surface) regions. But neutron radiography has shown the opposite. During a drying period, the soil close to roots appeared wetter than the bulk soil. Interestingly, the picture reversed after irrigation. Such observations are explained by mucilage exuded by roots. Mucilage favours water availability to plants during drying but, on the other hand, decreases water storage in the root zone after irrigation. The observed dynamics have potential applications for improving water-use efficiency and crop production.

A well-established concept

Water flows from soil to roots following a negative gradient in water potential that comprises gravity and capillary forces. Roots work as pumps that take up water from the soil in the vicinity, the *rhizosphere*. Water that is removed from the rhizosphere is then replaced by water flowing from more distant soil. In other words, water moves from wetter and more distant soil to the relatively dryer rhizosphere [1].

This concept is well known and is included, in various degrees of complexity, in models of root water-uptake. However, there are a few factors that make the story a little more complicated. The non-linearity of the soil hydraulic conductivity and the radial geometry of the flow cause a dramatic drop in water potential and water content in the first few millimetres next to roots. This is true, of course, only if the soil around the roots is homogeneous, an assumption that all the existing models are based upon. These decreases in water potential and water content are extremely difficult to measure in situ at the required resolution, and the existing models of root water-uptake are therefore partly speculative.

Neutron radiography experiments

Neutron radiography, with its high sensitivity to hydrous materials, offers a great opportunity for studying root and water distributions in situ [2, 3]. Such measurements have thus consequently been performed at the NEUTRA beamline at SINQ, PSI. Neutron radiography was used to investigate where and when water depletion occurs around roots of transpiring plants growing in soil samples of size 15 × 15 × 1.5 cm. According to current concepts, water depletion should occur around the most active parts of the roots. Our goal was to image the temporal and spatial dynamics of such water depletions.

Unexpected results

The measurements showed a different story to that expected. Instead of observing water depletion around the roots, we observed an increase in water towards the roots, even though water was flowing to the roots. However, if the soil around roots was really homogeneous, our results would be physically impossible. It would be like a ball rolling uphill against

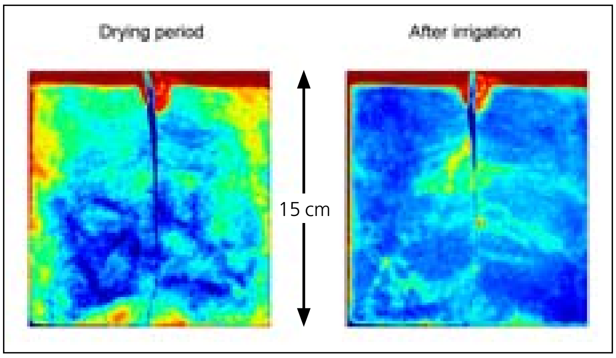


Figure 1: **Neutron radiography of water distribution in a sample filled with a sandy soil and planted with a lupin. The pictures show the water content (blue = more water). Left: sample during the drying period, with more water around the roots. Right: sample after irrigation, with the rhizosphere dry.**

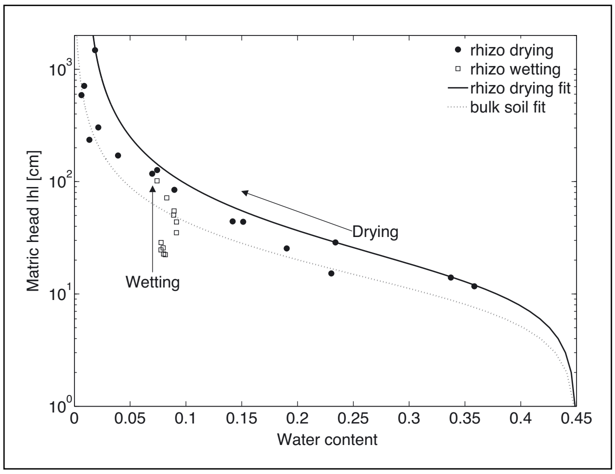


Figure 2: **Water retention curve of rhizosphere and bulk soil derived from radiographs. During drying, the rhizosphere holds more water than the soil. During wetting, it holds less water. The matric head expresses the water potential in centimetres head.**

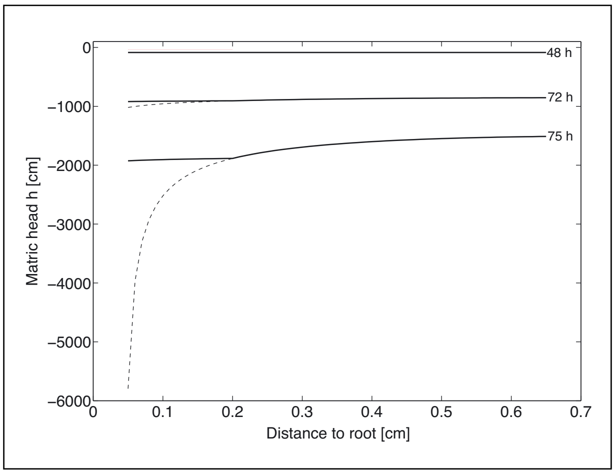


Figure 3: **Calculated water potential near a root with (solid line) and without rhizosphere (dotted line). The rhizosphere weakens the drop in water potential that would occur in the case of a homogeneous soil, but favours root uptake as soil dries.**

gravity. Another surprise occurred when the samples were irrigated after a drying period of 5 days. We observed that the rhizosphere remained dry for the subsequent 2 days, although the bulk soil was wet. It was unlikely that such large and continuous water depletion was caused by root uptake.

“Your plants are faulty” was a common comment after presentation of these results.

However, searching in the literature, we found similar results in studies on bacteria. Bacteria are surrounded by extracellular polymeric substances (EPS) that act as a protective layer against desiccation and fast rewetting. EPS has a very high water-holding capacity and a slow rehydration rate compared with soils [4]. Several studies have reported similar substances around roots, commonly referred to as mucilage [5].

We concluded that mucilage exuded by roots is a very reasonable hypothesis to explain our observations. Mucilage alters the hydraulic properties of the rhizosphere. Based on the radiographs and image analysis, we found that the water-holding capacity of the rhizosphere differs from that of the bulk soil. It is strongly hysteretic, and has an additional behaviour caused by mucilage re-hydration. The resulting heterogeneity of the rhizosphere compared with the bulk soil determines the water dynamics in the rhizosphere.

Significance for root water uptake

The properties of the rhizosphere can affect the gradients of water potential close to roots; we have investigated this by analytical calculation of the water potential near a single root, assuming a homogeneous soil or a heterogeneous soil, i.e. bulk soil plus rhizosphere. The hydraulic properties of the bulk soil and rhizosphere were derived from the neutron radiographs. We found that the rhizosphere, with its high water-holding capacity, restrained water depletion next to roots and significantly weakened the drop in water potential as the soil dried. Evidently, this favours water availability to plants during drought, helping plants to survive in arid regions. In other words, plants have learned to modify their soil in order to facilitate water uptake.

But mucilage may also have counteracting effects, as the reduced wettability of the rhizosphere after drying can reduce water storage capacity in the root zone. In fact, irrigation at high rates, separated by long dry periods, will result in strong water leaching into the deep soil profile with the root zone remaining relatively dry. On the other hand, frequent irrigation with slow infiltration rates will maintain the mucilage hydrated, with beneficial consequence for water and nutrient uptake.

This study has shed new light on the specific and dynamic properties of the root-soil interface. Including the rhizosphere’s dynamics in irrigation policy may help to increase water storage in the root-zone, decrease water leaching, and improve water-use efficiency.

Bibliography

[1] W. R. Gardner, Soil Sci. **89** 63 (1960).
[2] H. Pleinert and E. Lehmann, Physica B **234** 1030 (1997).
[3] A. B. Moradi et al., Plant Soil **318** 243 (2009).
[4] C. Chenu, Geoderma **56** 143 (1993).
[5] M. E. McCully and J. S.Boyer, Phisiol. Plantarum **99** 169 (1997).

Interaction between the magnetic and superconducting order parameters in a superconducting wire

Meni Shay, Amit Keren, Gad Koren, Amit Kanigel, Oren Shafir, Lital Marcipar, *Department of Physics, Technion – Israel Institute of Technology, Israel;* Gerard Nieuwenhuys, *PSI and Leiden University, The Netherlands;* Elvezio Morenzoni, Andreas Suter, Thomas Prokscha, Moshe Dubman, Zaher Salman, *Laboratory for Muon Spectroscopy, PSI, Switzerland;* Daniel Podolsky, *Department of Physics, University of Toronto, Canada*

The interplay between magnetism and superconductivity continues to be a central issue in high-temperature superconductivity. In this report we present a low-energy muon spin relaxation (LE-μSR) investigation addressing this issue in a superconducting "wire". The wire was made of a $La_{1.94}Sr_{0.06}CuO_4$ film and had a cross-section of 0.5×100 μm². We found that running a current through the wire, which suppresses the superconducting order parameter, increases the magnetic transition temperature. Our results indicate that the Ginzburg-Landau coupling constant between the superconducting and magnetic order parameters is repulsive.

When cuprates are doped, their low-temperature ordered phase changes from antiferromagnetic (AFM) to superconducting (SC). The transition takes place over a range of doping levels where, at low enough temperatures, the samples are both superconducting and magnetic [1–3]. Phase separation is usually expected to be due to inhomogeneous doping. However, a local probe measurement using μSR indicated that the whole volume of the sample is magnetic, i.e. static magnetic fields are present in the full volume, including the SC regions [1]. The nature of the coexisting superconductivity and magnetism remains a puzzle, with many remaining questions: What is the type of the transition between the AFM and SC phases as a function of doping? Is it first-order with phase separation, or second-order with coexistence? Are the two orders coupled, and what are the nature and strength of the coupling?

Here we address these questions by studying the effect of a current running in a superconductor, I, on the magnetic phase transition temperature, T_m. A current of the order of the second critical current I_{c2} (where the sample becomes normal) decreases the superconducting order parameter. If the two orders interact, the magnetic order parameter would be expected to be influenced by the current and either increase or decrease, depending on the nature of the coupling between the two orders. This, in turn, will increase or decrease T_m, respectively. Measurements were taken on an 8-m-long wire made of a $La_{1.94}Sr_{0.06}CuO_4$ film (shown in Figure 1). The thickness of the film, 0.5 μm, was chosen to be of the order of the penetration depth, such that the current flows in the bulk of the wire. For this doping level, the superconducting and magnetic transition temperatures are T_c=10 K and T_m=6 K, respectively. Probing the magnetic properties of such a thin wire was achieved by using the LE-μSR technique [4, 5]. In this technique, fully polarized muons are implanted with a tuneable low energy into the sample, such that the muons can be stopped in thin samples. Each implanted muon decays (lifetime τ=2.2 μs), emitting a positron, preferentially in the direction of its polarization at the time of decay. Using appropriately positioned detectors, the asymmetry of the muon beta decay is measured as a function of time, which is proportional to the time evolution of the muon spin polarization.

In Figure 2 are presented examples of muon spin depolarization curves measured in the meander wire at several tem-

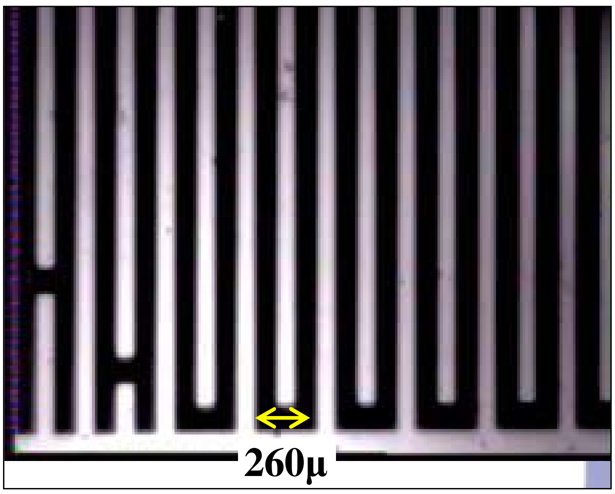


Figure 1: **A magnified image of part of the SC wire.**

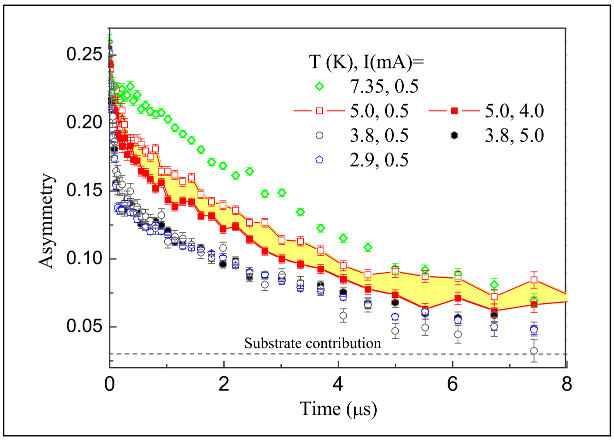


Figure 2: **Muon decay asymmetry measurements versus time, with high (solid symbols) and low (open symbols) currents.**

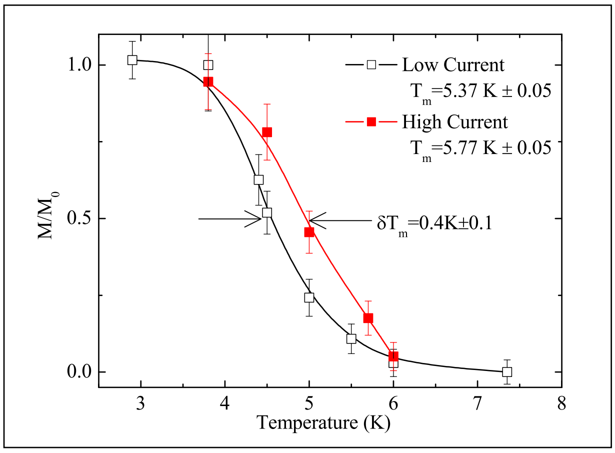


Figure 3: **The magnetic phase transition with high (*0.2I_{c2}*) and low currents. *M/M_0* is the magnetic moment of the wire normalized to its low temperature value *M_0*. The solid lines are guides to the eye.**

peratures and zero applied magnetic field. The solid and open symbols represent measurements with high and low currents, respectively. At $T>T_m$, the asymmetry resembles a Gaussian curve with relatively slow relaxation, typical of magnetic fields generated by copper nuclear magnetic moments. As the temperature decreases, there is a clear increase in the muon spin depolarization rate, indicating that the sample is becoming magnetic.

The effect of the current can be clearly seen in the T=5 K measurements (red squares in Figure 2). The muon spin depolarization rate is considerably faster when a higher current is applied. The difference between the two measurements is highlighted by the shaded area. The change in the rate caused by the application of current is equivalent to cooling by 0.3–0.4 K. Note that the stability of the temperature, which was monitored by using the wire itself as a thermometer, was maintained to within ±0.01 K.

The effect of the current was measured as a function of temperature across the magnetic transition. The magnetization of the wire, M, was evaluated from all measurements by comparing the integrated asymmetry to its value in the lowest temperature measured. As shown in Figure 3, the application of a current of about 0.2$I_{c2}(T)$ increases the magnetic phase transition temperature by 0.4±0.1 K. Note also that, above T_m and below 4 K, the application of current has no effect on the asymmetry. The fact that the current increases T_m without broadening the transition rules out the possibility of temperature inhomogeneities.

The increase of T_m upon application of current implies that the orders are coupled repulsively. This is complementary to the effect of a strong magnetic field on doped samples, where the magnetic order is enhanced while the superconducting order is suppressed [6, 7]. However, since current, in contrast to magnetic field, does not couple directly to spin, the effect presented here is much simpler to analyze. For example, it shows that enhanced magnetism in an applied field could be a result of supercurrent in the bulk [8] and not necessarily due to magnetism in the vortex core [9]. Furthermore, analysis based on the Ginzburg-Landau (GL) model shows that the phase transition between AFM and SC must be close to the border between first and second order [10].

References

[1] F. Borsa, P. Carretta, J. H. Cho, F. C. Chou, Q. Hu, D. C. Johnston, A. Lascialfari, D. R. Torgeson, R. J. Gooding, N. M. Salem, K. J. E. Vos, Phys. Rev. B **52** 7334 (1995).

[2] M.-H. Julien, F. Borsa, P. Carretta, M. Horvatic, C. Berthier, C. T. Lin, Phys. Rev. Lett. **83** 604 (1999).

[3] J. M. Tranquada, B. J. Sternlieb, J. D. Axe, Y. Nakamura, S. Uchida, Nature **375** 561 (1995).

[4] T. Prokscha, E. Morenzoni, K. Deiters, F. Foroughi, D. George, R. Kobler, A. Suter, V. Vrankovic, Nucl. Instrum. Methods Phys. Res. A **595** 317 (2008).

[5] E. Morenzoni, F. Kottmann, D. Maden, B. Matthias, M. Meyberg, T. Prokscha, T. Wutzke, U. Zimmermann, Phys. Rev. Lett. **72** 2793 (1994).

[6] S. Katano, M. Sato, K. Yamada, T. Suzuki, T. Fukase, Phys. Rev. B **62** R14677 (2000).

[7] B. Lake, H. M. Rønnow, N. B. Christensen, G. Aeppli, K. Lefmann, D. F. McMorrow, P. Vorderwisch, P. Smeibidl, N. Mangkorntong, T. Sasagawa, M. Nohara, H. Takagi, T. E. Mason, Nature **415** 299 (2002).

[8] E. Demler, S. Sachdev, Y. Zhang, Phys. Rev. Lett. **87** 067202 (2001).

[9] J.-P. Hu, S.-C. Zhang, J. Phys. Chem. Solids **63** 2277 (2002).

[10] M. Shay, A. Keren, G. Koren, A. Kanigel, O. Shafir, L. Marcipar, G. Nieuwenhuys, E. Morenzoni, A. Suter, T. Prokscha, M. Dubman, D. Podolsky, Phys. Rev. B **80** 144511 (2009).

On the discovery of a new form of salty ice and its potential relevance for astrophysics

Thierry Strässle, *Laboratory for Neutron Scattering, ETH Zürich and PSI;* Stefan Klotz, Livia E. Bove and Antonino M. Saitta, *IMPMC, Université P&M Curie, France;* Thomas C. Hansen, *Institut Laue Langevin, Grenoble, France*

Water ice, no matter what kind it is, cannot incorporate large amounts of salt. When frozen, salty water expels ions and the ice formed contains a lower salt concentration. Here we report on the discovery that salty water may well accept large amounts of salt, if it is frozen under high-pressure. Neutron scattering experiments reveal that salt ions are incorporated within the network of water molecules, very much as in the case of an alloy. The cations are thought to remain mobile, giving rise to electrical conductivity – large enough to explain the observed magnetic fields of the moons of Jupiter and Saturn, if such ice exists there...

Frozen water is normally unable to incorporate large amounts of salt. This property is important for our climate, because, when seawater freezes, a solution of higher salinity, so-called brine, is expelled. Since this has a higher density than the seawater before, it sinks and drives oceanic circulations in the polar region. At the same time, the frozen ice contains less salt.

Neither our ice, nor exotic ice, likes salt…

The inability of ice to incorporate large amounts of salt is not exclusive to the ordinary (hexagonal) form of ice, but applies to more exotic forms of ice as well. When compressed above 2000 bar, ice adopts various structures different from ordinary (hexagonal) ice, which do not exist on Earth. For pure water, a total of 15 crystalline ice phases have so far been identified, up to pressures of more than 800 kbar [1], but none of these is reported to accept large amounts of salt. Salt hydrates constitute an exception, but these so-called clathrates form a framework around salt ions and so their structure cannot be compared with the known phases of pure ice.

…with one exception…

Here we report on the discovery that LiCl, up to a salinity corresponding to one LiCl per six molecules of water, can be incorporated into a structure of pure ice, more precisely the so-called Phase VII ice [2]. Ice VII is the dominant phase of ice over a broad range of pressure from 21 to about 800 kbar.

For the experiments performed on the neutron powder diffractometer D20 at ILL, about 70 mm^3 of LiCl:6D_2O solution were placed in an opposed-anvil pressure cell (Paris-Edinburgh VX5 type), cooled to 80 K and compressed in-situ at 80 K to 40 kbar. At these conditions, the structure of the sample is disordered (amorphous), as readily found by powder neutron diffraction. However, when the sample is warmed up under 40 kbar, sudden crystallization is observed near room temperature (Figure 1). Neutron diffraction unambiguously enables this structure to be assigned to ice VII, i.e. the form of pure

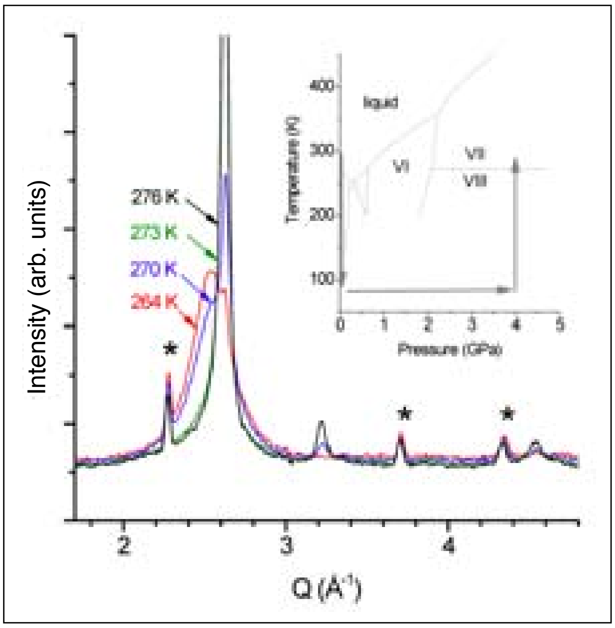


Figure: 1: **Neutron diffraction patterns of LiCl:6D_2O upon warming under 40 kbar pressure (see inset). Close to room temperature the amorphous sample (broad peak) crystallizes into salty ice VII (sharp peak). The tails around the main reflection peak are due to Huang scattering (see text). Reflection peaks marked with asterisks are from the pressure cell.**

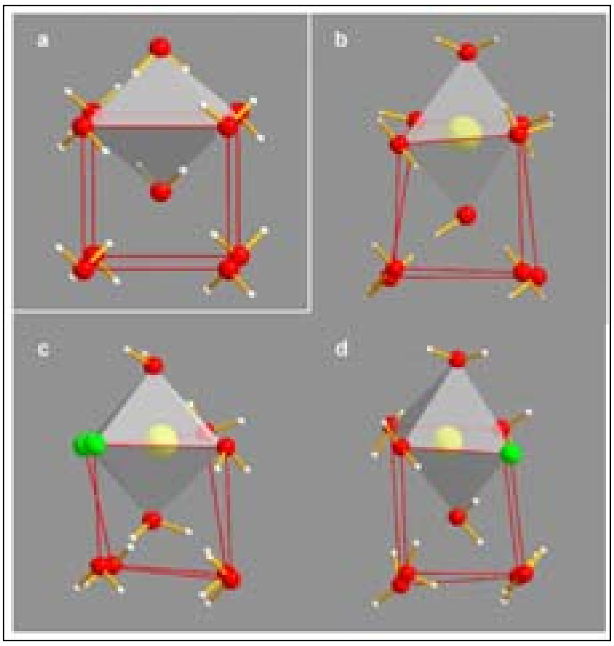


Figure 2: **Snapshots of possible instantaneous configurations of pure ice VII (a) and salty ice VII (b-d) incorporating interstitial Li cations (yellow) and site substituted Cl anions (green).**

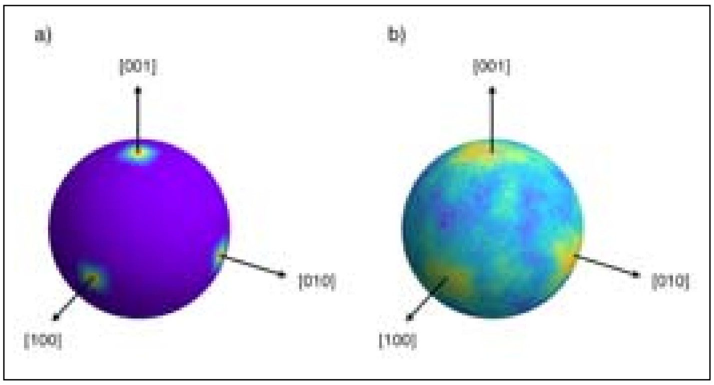


Figure 3: **Spatial distribution of the H_2O dipole moment of pure ice VII (left) and salty ice VII (right). In salty ice VII, the distribution is not strictly octahedral, and if dynamically distributed, is indicative of a plastic solid.**

water that is expected to occur naturally at this temperature and pressure. The diffraction pattern further shows so-called Huang diffuse-scattering characterized by tails around the main reflection peaks. This indicates that the structure is slightly distorted. Indeed, numerical simulation shows that the water molecules are off their ideal positions compared with pure ice VII. Neutron diffraction did not enable the positions of Li and Cl ions to be determined. However, from simulations, the Cl anions are found to replace water molecules, whereas the Li cations are positioned between sites of the water molecules (Figure 2). This calculated structure is in excellent agreement with the observed diffraction pattern and nicely demonstrates the power of combined experimental and simulation methods.

Owing to its free position, the Li cation is thought to be able to jump from site to site, resulting in ionic conductance of the compound. When the temperature is high enough, water molecules are further believed to rotate around their centre of mass, resulting in what is called a plastic solid (Figure 3). Indeed, preliminary quasi-elastic neutron scattering experiments carried out on the cold-TOF spectrometer FOCUS at SINQ allowed the dynamics of the hydrogen atoms in the sample to be examined and gave first evidence of such a scenario.

This salty ice VII would thus represent the first plastic form of ice reported so far, although plasticity is expected by theory [3]. Experiments on direct measurement of the conductivity of salty ice VII under pressure, as well as more detailed quasi-elastic measurements on the hydrogen dynamics, are in preparation.

…that may exist on far-distant moons.

High-pressure forms of ice are known to exist on the large moons of Jupiter, such as Ganymede, Europa and Callisto, as well as on Saturn's Titan. Furthermore, recent data from the Galileo and Cassini missions indicate subsurface *salty* oceans on some of them [4]. Hitherto, modelling of the interior of these bodies had assumed pure ice. Significantly, salty ice VII, with an estimated ionic conductivity of the order of 10^{-2} Sm^{-1}, would be sufficient to explain the observed magnetic fields of Europa and Callisto.

References

[1] V.F. Petrenko, R.W. Whitworth, Physics of ice, Oxford University Press, Oxford 1999 (and referenced therein).

[2] S. Klotz, L.E. Bove, Th. Strässle, Th. C. Hansen, A.M. Saitta, Nature Materials **8** 405 (2009).

[3] Y. Takii, K. Koga, H. Tanaka, J. Chem. Phys. **128** 204501 (2008).

[4] T.B. McCord, G.B. Hansen, C.A. Hibbitts, Science **292** 1523–1525 (2001); Ch. Zimmer, K.K. Khurana, M.G. Kivelson, Icarus **147** 329 (2000).

How large is the proton?

Aldo Antognini, *for the CREMA collaboration: Max Planck Institut für Quantenoptik, Garching, Germany; Laboratoire Kastler Brossel, Paris, France; Univ. of Coimbra, Portugal; Univ. of Aveiro, Portugal; Univ. of Fribourg, Switzerland; IFSW, Stuttgart, Germany; Dausinger & Giesen GmbH, Stuttgart, Germany; Univ. of Tsing Hua, Hsinchu, Taiwan; ETH, Zürich, Switzerland; Laboratory for Particle Physics, PSI*

We have measured the 2S-2P energy difference in muonic hydrogen (an atom composed of a muon and a proton) with a precision of 18 ppm, allowing us to determine the rms charge radius of the proton with a relative accuracy of 0.1%. Knowledge of this radius has opened the way for testing the theory describing hydrogen energy levels with previously unachievable levels of accuracy. However, a discrepancy with existing data has emerged from our measurement, revealing problems in one of the most precisely studied physical systems from both the theoretical (bound-state QED) and experimental (laser spectroscopy) points of view.

Because of its relatively simple atomic structure, consisting only of a proton and an electron, the hydrogen atom has been central to the development of the theories of atomic structure, quantum mechanics, and quantum electrodynamics (QED). For example, the small observed deviation of 2S-2P energy splitting from the prediction of the Dirac equation, called the Lamb shift, triggered the development of QED. This was a major milestone in the long adventure of hydrogen spectroscopy, and marked the beginning of the modern era of precision spectroscopy.

The need for increased precision has inspired many advances in laser techniques, including two-photon spectroscopy, laser cooling of atoms, and, most recently, the femtosecond laser frequency comb. In particular, the 1S-2S transition frequency in hydrogen has been determined with a relative accuracy of 10^{-14} [1]. However, prior to our experiment, comparison of these highly accurate measurements with theoretical prediction had been limited by the poorly known value of the proton radius. The finite size of the proton (i.e. the fact that the proton is not point-like) affects the hydrogen ground state energy at the 10^{-10} level.

Our experiment, which has decreased the uncertainty in the proton rms charge radius by an order of magnitude, has thus opened a new chapter in the decryption of one of the most important "Rosetta stones" in physics: the hydrogen atom.

Muonic hydrogen and the proton radius

Muonic hydrogen is an exotic atom composed of a muon and a proton. The muon mass is roughly 200 times that of the electron, which means that in muonic atoms the orbiting particle moves with an average radius 200 times smaller than in "normal" atoms. As a consequence, the influence of the nuclear (in our case the proton) finite size on the energy levels is significantly increased. Hence muonic atoms represent a unique laboratory for the determination of rms charge radii and other nuclear properties.

In our experiment, precision laser spectroscopy was applied to muonic hydrogen, whose energy levels are very sensitive to proton size, and thus we have measured the 2S-2P energy splitting. By comparing the measured 2S-2P transition frequency with the theoretical prediction, a very precise determination of the proton charge radius has been made.

Experiment

The principle of the experiment is to capture negative muons in hydrogen, whereby muonic hydrogen in highly excited states is formed. Most of these de-excite quickly to the 1S ground state, but 1% populate the metastable 2S state. A short laser pulse [2], tuneable around a wavelength of 6 μm (corresponding to the energy of the 2S-2P transition), illuminates the muonic atom one microsecond after its formation. When the laser frequency is resonant, the 2S-2P transition is induced, immediately followed by de-excitation to the ground state with the emission of a 2P-1S 2 keV X-ray. The detection of this X-ray coincident with the laser light is used as a signature of the 2S-2P transition. A resonance curve is obtained (see Figure 1) by plotting the number of detected 2 keV X-rays co-

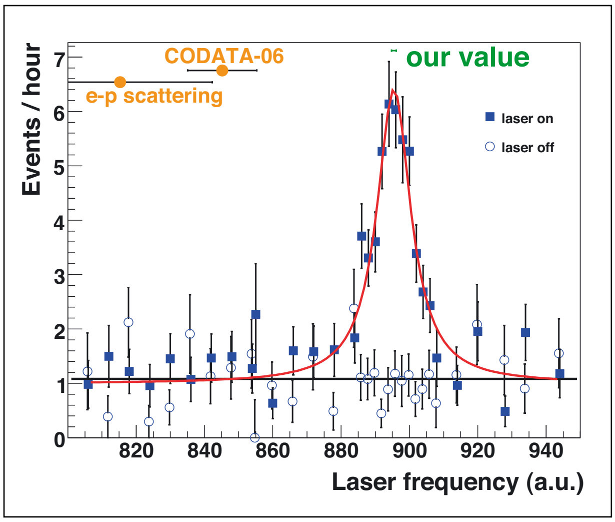


Figure 1: **Resonance curve of the 2S-2P transition in muonic hydrogen. On resonance, we have measured a rate of 6 events per hour. The line position predictions (in orange) have been computed using the proton radius values given in [3] and [4].**

incident with the laser pulse as a function of the laser frequency.

From the centroid position of this line, which has been inferred with 18 ppm relative accuracy, a proton radius of 0.841(1) fm was deduced [5]. This new value of the proton radius is 10 times more precise than previously obtained, but disagrees by 5 standard deviations from the current CODATA value [3].

Proton radius puzzle

The origin of this large difference is not yet known. It may come from the theory of muonic hydrogen energy levels (used to deduce the new value), or from problems in hydrogen experiments or theory (both used to deduce the CODATA value).

If the problem comes from muonic hydrogen energy level theory, an astonishingly large term (larger than 10^{-3} of the 2S-2P energy difference) would be missing. It is improbable that a term of such magnitude has been forgotten. If the theory used to extract the proton radius from muonic hydrogen is correct, then the problem arises from hydrogen spectroscopic experiments (measurement of the 1S-2S, 2S-8S, 2S-12D... transition frequencies) or from the theoretical prediction of the Lamb shifts in hydrogen, which is based on bound-state QED.

Why the proton radius is important

The small uncertainty in the new proton radius value (1×10^{-18} m) has opened the way for checking bound-state QED calculations (prediction of the 1S Lamb shift) in hydrogen to an unprecedented level of accuracy (3×10^{-7}). This is very intriguing, since bound-state QED is challenging, both from technical (mathematical) and from fundamental (binding effects, relativistic two-body system) points of view. Bound-state QED in hydrogen has to deal with several expansion parameters which account for radiative, recoil, relativistic, binding, and nuclear structure effects. Already, calculation of the one-loop radiative contributions has taken more than five decades, because of the complexity of the binding properties. A large community is currently working on the two-loop contributions. Two different approaches to the binding effects have been developed: one perturbative and one all-order/non-perturbative [6]. Our experiment has opened the way for checking these problematic terms and the various approaches. Hydrogen may therefore be considered as a platform for developing tools for even more strongly bound systems.

In summary, the new proton radius value will lead to:

- An order-of-magnitude more precise testing of the theory describing hydrogen energy levels.
- An order-of-magnitude improvement to the Rydberg constant (to a relative level of 1×10^{-12}), which is a major player in the constants adjustment [3].
- A benchmark for lattice QCD calculation aiming to model the proton, starting from quarks and their interactions [7].
- Confrontation with the electron-proton scattering domain, which is the historical way used to determine the proton radius [4].

References

[1] M. Niering et al., Phys. Rev. Lett. **84** 5496 (2000).
[2] A. Antognini et al., IEEE J. Quant. Electr. **45** (8) 993-1005 (2009).
[3] P. J. Mohr et al., Rev. Mod. Phys. **80** 633 (2008).
[4] P.G. Blunden et al., Phys. Rev. C **72** 057601 (2005).
[5] R. Pohl et al., submitted to Nature (2010).
[6] V.A. Yerokhin, Phys. Rev. Lett. **80** 040501 (2009).
[7] P. Wang et al., Phys. Rev. D **79** 094001 (2009).

MEG – first results

Peter-Raymond Kettle, *Laboratory for Particle Physics (LTP), PSI – representing the MEG Collaboration: BINP Novosibirsk, Russia; Univ. of California, Irvine, USA; ICEPP, Univ. of Tokyo, Japan; INFN & Univs. of Genova, Lecce, Pavia, Pisa and Roma Sapienza, Italy; JINR Dubna, Russia; KEK, Japan; PSI, Switzerland; Waseda Univ., Japan*

The search for "New Physics" beyond the Standard Model (SM) is not only restricted to the high-energy frontier of TeV-scale accelerators. With low-energy but high-intensity machines, sensitive probes such as the muon allow processes to be experimentally tested which are seen as forbidden in the SM, yet predicted as rare in theories beyond the SM. One such process, the decay of a muon into a positron and a photon (mu→e gamma or MEG), would violate lepton-flavour conservation in the SM and hence signify "New Physics". The search for this decay is the goal of the MEG experiment.

Lepton-flavour conservation in the SM – the conservation of the sum of the lepton numbers associated with each particle of a given generation (flavour) in a reaction, is linked to the assumption of neutrinos being massless. However, the experimental verification of neutrino oscillations [1] demonstrates that the flavour state of a neutrino is a mixture of definite mass eigenstates, i.e. neutrinos have mass and lepton-flavour mixing occurs in the neutral lepton sector.
In the charged lepton sector, the search for lepton-flavour violation (LFV) dates back some 60 years to the pioneering search by Hinks & Pontecorvo [2] for the decay $\mu^+ \rightarrow e^+\gamma$ in cosmic rays. To date, no signal has been observed. Extending the SM to include neutrinos of a tiny but finite mass allows lepton flavours to mix and the decay $\mu^+ \rightarrow e^+\gamma$ can then occur, but at a level that is well beyond experimental detection. Theories beyond the SM, such as Supersymmetry (SUSY) or Grand Unification (SUSY-GUT), predict sizeable LFV [3]. Hence, the MEG experiment, with its state-of-the-art detector technology and experimental techniques, has a very real chance of discovery.

First physics run

Following an initial short engineering run at the end of 2007, an extensive period of re-installation, xenon purification and detector testing and calibration culminated in our first physics run, between September and December 2008. Reduced

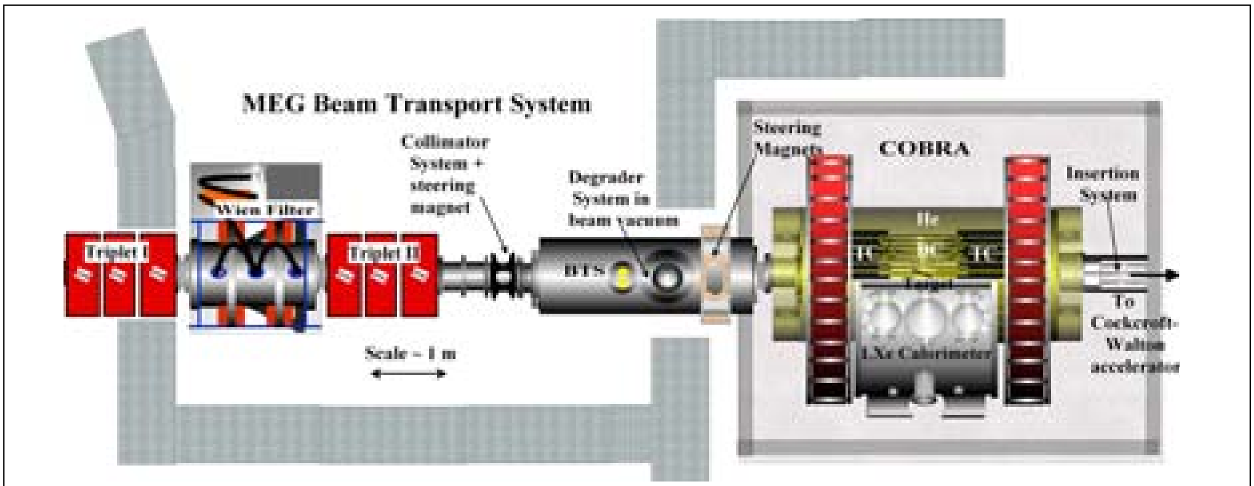


Figure 1: **Schematic of the MEG experiment, showing the surface muon beam transport system, on the left, coupled to the superconducting COBRA positron-spectrometer and LXe photon detector. The drift chambers (DC) and timing-counter arrays (TC), as well as the thin target, are shown inside the COBRA magnet.**

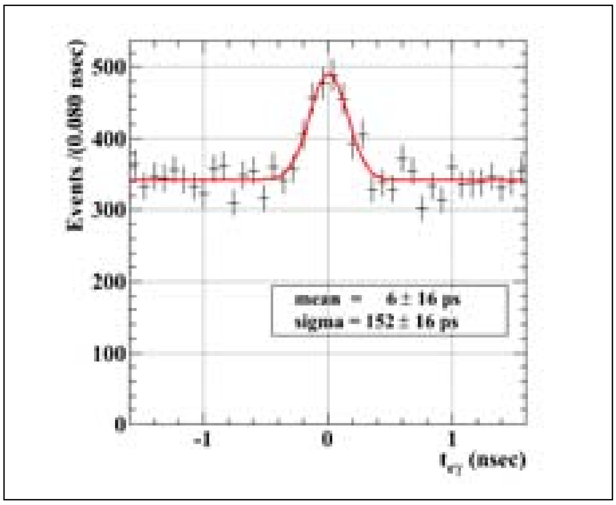


Figure 2: **Measured coincidence time spectrum $t_{e\gamma}$ at normal beam rate, showing the RMD peak above the accidental background and the fitted resolution function.**

beam time in 2009 meant that the first-half of the year was dedicated to the analysis of our first data, in parallel with major modifications to the drift chamber system (DC), to solve a high-voltage stability problem encountered during the previous run. An upgrade to the DRS digitization electronics was also undertaken. The remaining three months of data-taking time proved that the chambers could run at full efficiency and, in total, a further 93 TB of data were taken in 2009.

First results

The $\mu^+ \rightarrow e^+\gamma$ process is characterized by a 2-body final state, with the positron and photon being coincident in time and emitted back-to-back in the rest frame of the muon, each with an energy equal to half of the muon mass. Hence, a positron spectrometer and a photon detector with excellent temporal, spatial and energy resolutions are prerequisites. In addition, a high intensity, good-quality muon beam, as well as minimal stopping material, is required to minimize the two major sources of background: prompt radiative muon decay (RMD) $\mu \rightarrow e\nu\bar{\nu}\gamma$ and accidental coincidences between a high-energy e^+ from normal Michel muon decay $\mu \rightarrow e\nu\bar{\nu}$ and a high-energy photon from, for example, RMD, positron annihilation-in-flight or bremsstrahlung. The layout of the experiment is shown in Figure 1, with surface muons of 28 MeV/c entering from the left and finally stopping in a thin slanted target, placed at the centre of the COBRA superconducting magnetic positron spectrometer. The tracking is done using drift chambers, while fast scintillator timing-counters measure the e^+-time. A 900 litre liquid xenon photon detector is used to measure the energy, time and conversion point of the photon. This allows full reconstruction of the event [4].

Our 2008 data sample corresponds to almost 10^{14} muons stopped in the target. A “blind analysis” approach was adopted, to prevent any bias in the procedure. After an initial pre-selection of the data, 16% of events remained. These data were then re-processed for those events that fell into a predefined window, “blinding-box”, containing the signal region for two parameters: the γ-ray energy (E_γ) and the time difference between the photon and positron ($t_{e\gamma}$). These events were written to separate “hidden” data files; to be analyzed only after the analysis procedure had been optimized, using events outside of this blinding-box in the “side bands”.

A candidate $\mu^+ \rightarrow e^+\gamma$ event is characterized by 5 measured kinematic parameters: positron energy (E_e); photon energy (E_γ); relative time between the photon and positron ($t_{e\gamma}$); and the opening angles between the two particles ($\theta_{e\gamma}$ and $\phi_{e\gamma}$). Figure 2 shows the $t_{e\gamma}$-distribution for coincident photons and positrons, extracted from the physics data in the energy region 40 MeV $\leq E_\gamma \leq$ 45 MeV, i.e. below the blinding-box. The RMD peak is clearly seen above the accidental background and demonstrates the quality of the coincidence measurement for signal $\mu^+ \rightarrow e^+\gamma$ events. The timing resolution for signal events (at 52.8 MeV) is estimated to be $\sigma_t = (148 \pm 17)$ ps.

Once the algorithms had been optimized and the background study completed, the blinding-box was opened and the number of signal candidate events determined by means of a maximum likelihood fit in the analysis region. The likelihood function is constructed from terms representing the number of events in each class: signal, RMD and background events, together with their respective probability density functions. The latter describe the 5 parameters for each class of events and come from data or Monte-Carlo simulation tuned to data. From the fit, the 90% confidence intervals and confidence level (C.L.) upper limits on the number of signal and RMD events were determined using the Feldman-Cousins approach [5]. We obtained $N_{SIG} < 14.7$ (90% C.L.). When normalized to the number of Michel e^+, counted simultaneously during the experiment, and using the same analysis cuts, we obtain the limit on the branching ratio for the $\mu^+ \rightarrow e^+\gamma$ decay of: BR ($\mu^+ \rightarrow e^+\gamma$) $\leq 2.8 \times 10^{-11}$ (90% C.L.). Based on only 3 months of data collection, our branching ratio sensitivity [5] is comparable with that of the current branching ratio limit set by the MEGA experiment [6].

References

[1] C. Amsler et al, *2008 Review of particle physics,* Phys. Lett. B **667** 163 (2008).

[2] E.P. Hincks, B. Pontecorvo, Phys. Rev. **73** 257 (1948).

[3] R. Barbieri, L.J. Hall, Phys. Lett. B **338** 212 (1994) & J. Hisano et al., Phys. Rev. D **53** 2442 (1996).

[4] J. Adam et al., arXiv:0908.2594v1 [hep-ex] (2009).

[5] G.J. Feldman, R.D. Cousins, Phys. Rev. D **57** 3873 (1998).

[6] M.L. Brooks et al., Phys. Rev. Lett. **83** (1999) 1521.

Band formation from coupled quantum dots formed by a nanoporous network

Jorge Lobo-Checa [c], Manfred Matena [c], Kathrin Müller [a], Jan Hugo Dil [b,d], Fabian Meier [b,d], Lutz H. Gade [e], Thomas A. Jung [a], Meike Stöhr [c]

[a] *Laboratory for Micro- and Nanotechnology, PSI*

[b] *Laboratory for Synchrotron Radiation - Condensed Matter, PSI*

[c] *Department of Physics, University of Basel*

[d] *Physics Institute, University of Zurich*

[e] *Inorganic Chemistry Institute, Heidelberg University, Germany*

Researchers from PSI, together with partners from the Universities of Basel, Zurich and Heidelberg, have observed for the first time the coupling of quantum dots created by the interaction of a molecular network with the electronic states of the surface. This finding suggests the possibility of tuning surface properties, such as resistance, by imposing a tuneable network on specific surfaces, i.e. creating new metamaterials. This research implies novel controllable surface materials with future applications in sensors and computing.

The electronic and optical properties of crystalline solids exhibit characteristics that derive to a large extent from the periodic arrangement and interactions of their component quantum systems, such as atoms or molecules. Extending the principle of such periodic coupling beyond the molecular regime has given rise to metamaterials, which are composed of regularly repeated units, in most cases nanoparticles. Quantum effects that arise from the confinement of electronic states have been extensively studied for the surface states of noble metals, which are characterized by a quasi–two-dimensional (2D) electron gas. These may be visualized by scanning tunnelling microscopy (STM) as standing wave patterns arising from scattering at steps and defects or at large organic molecules, as visible in Figure 1a.

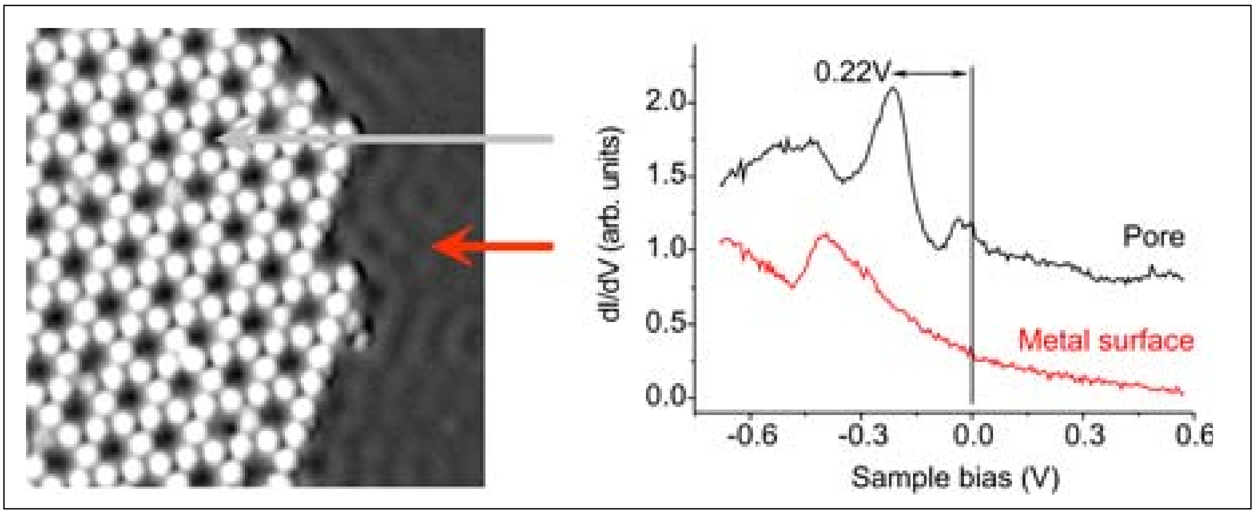


Figure 1: **a) Scanning Tunnelling Microscopy image of a porous molecular network on Cu(111). The perylene derivative DPDI forms a very stable self-assembled porous network with a periodicity of 2.55 nm and a pore diameter of ~1.6 nm. Standing wave patterns in the Cu surface state are visible in the image at the right which arise from the scattering of the delocalized electronic states at the border of the adsorbate adlayer; b) Scanning Tunnelling Spectroscopy (STS) study of the electronic density of states taken at the two reference points marked by arrows in the image on the left. STS spectra are obtained at 5 K on the clean Cu surface (red) and inside a pore of the molecular network (black). The latter spectrum exhibits a maximum at –0.22 V, which is attributed to a confined surface state.**

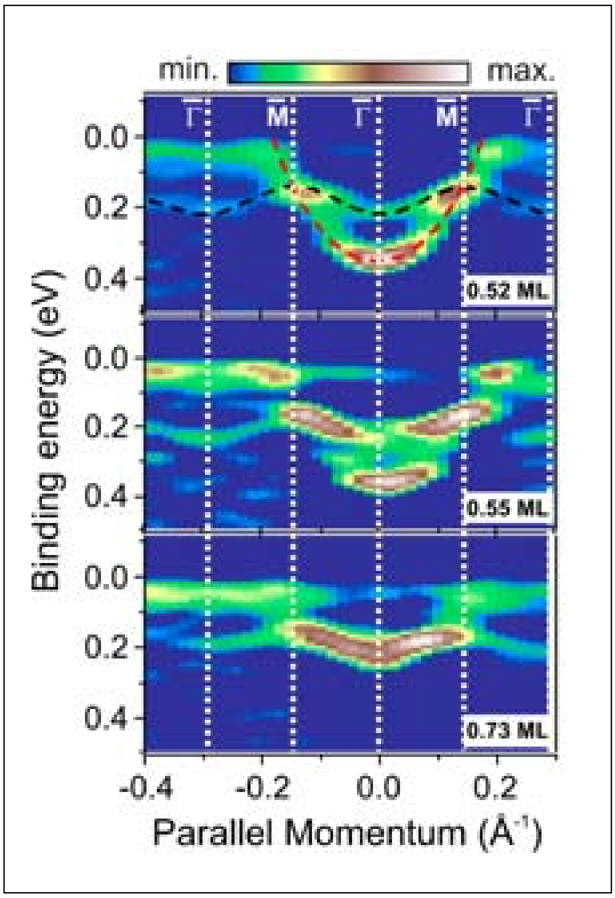


Figure 2: **Angle-Resolved Photoemission Spectra (2nd derivative) depicting the distribution of electronic states in a surface, dependent on the surface coverage of the porous network. The red and black dashed lines in the uppermost image indicate the averaged positions of the maxima of both Lorentzian components fitted for all measurements.**

Self-assembled nanoporous networks at surfaces exhibit a unique periodicity due to their assembly by programmed chemical and physical interactions and thermodynamic principles. Specifically, DPDI, a perylene derivative, has been chosen to demonstrate this: Upon thermal treatment at the surface, it is transformed into an H-bond donor and acceptor under the release of hydrogen, which then forms the porous network of Figure 1a.

Here we report on the interplay of the surface state electrons of Cu(111) with this supramolecular porous network, which creates an unprecedented quantum dot array. We used scanning tunnelling spectroscopy (STS) to probe the local (electronic) density of states (LDOS). Spectra recorded inside a pore display a peak at –0.22 V that is not observed on the bare metal (Figure 1b). This peak is assigned to the confinement of the surface state electrons inside the pore. Because each pore features a confined state, it can be considered as a single quantum dot that confines electrons in all three directions. The confinement stems from the interaction of the ad-molecules forming each nanopore of the network with the underlying electronic states in the substrate [2]. The inherent periodicity of the molecular network generates a regular "quantum dot array" (Figure 1a).

The electronic structure of our quantum dot array was investigated with angle-resolved photoemission spectroscopy (ARPES) at the COPHEE end-station of the Swiss Light Source. This laterally averaging surface-sensitive technique determines the binding energy of the occupied states of the system as a function of the electron momentum. In Figure 2, the 2nd derivative of the ARPES data is shown, which provides evidence of cooperative electronic behaviour. One band (highlighted in red) follows the characteristic parabolic dispersion of the Cu surface state whereas the second band (highlighted in black) is related to the periodic potential of the porous network. This interpretation is supported by the periodic continuation of the band within Brillouin zones of higher order that possess the same periodicity as the molecular network (10 times smaller than the substrate).

The underlying mechanisms for the observed behaviour can best be understood by comparing the electron-gas with waves in water. Waves in water are reflected by any obstacle they meet. If the obstacle on the surface in question resembles a honeycomb structure, standing waves are set up in each cell of the honeycomb. This then leads to a wave pattern representative of the honeycomb structure of the same size and shape. Therefore, each nanocavity will exhibit discrete electronic states of the 2D free-electron gas of the surface state. But the periodic arrangement of the pores within this network, along with the imperfection of its confinement, results in electronic bands analogous to the band structure of a solid created by the periodic potential of its atoms.

The established and prospective possibilities of controlling the structures of porous networks, together with the characteristic degree of coupling between ad-molecules and the surface state, suggests the fabrication of related systems with different band structures, resulting in 2D electronic metamaterials analogous to well-established optical metamaterials. Analogous to the picture of the water wave, the interaction of the network structure with the electron gas on the metal surface confines the electrons, giving rise to a characteristic electron wave structure in the new material.

References

[1] J. Lobo-Checa et al., *Band Formation from Coupled Quantum Dots Formed by a Nanoporous Network on a Copper Surface,* Science **325** 300-303 (2009).

[2] A. Scheybal et al., *Modification of the Cu(110) Shockley surface state by an adsorbed pentacene monolayer,* Physical Review B **79** 115406 (2009).

There is *still* plenty of room at the bottom: Top-down nanolithography at PSI

Yasin Ekinci, Christian David, *Laboratory for Micro- and Nanotechnology, PSI*

In 1959, Richard Feynman pointed out the great potential of nanotechnology in his celebrated talk, "There is plenty of room at the bottom". Indeed, during the past 50 years, nanotechnology has become a significant feature across the traditional disciplines of science and technology, with ever-increasing pace. Recent investment in lithographic tools and techniques has boosted PSI's capability for investigating the properties of nanometre-scale structures – with applications spanning a wide range of disciplines.

As already envisaged by Feynman [1], two fundamental approaches exist for creating nanometre structures. "Bottom-up" methods, involving the synthesis of devices from elementary – possibly atomic – building blocks, give ultimate resolution, but the assembly of complex designs becomes a tough challenge. The "top down" approach, i.e. the miniaturization of machining processes, has already revolutionized our lives; the most obvious example being today's integrated circuits for computing and telecommunication.

The Laboratory of Micro- and Nanotechnology (LMN) is pursuing cutting-edge research in fundamental and applied micro- and nanotechnology. The research areas of LMN, including molecular nanoscience, nano-magnetism, nano-optics, X-ray optics and sensor devices, have been supported by its state-of-the-art cleanroom laboratories with micro- and nanofabrication facilities. In 2009, a new, high-end electron-beam lithography system was installed (Figure 1a) and an upgrade made to the EUV-IL facility.

A sharp knife of fast electrons

Similar to a scanning electron microscope, a tightly focused electron beam can be used to "write" features with nanometre resolution. LMN's new Vistec EBPG5000+ is among the best systems in the world in terms of resolution, accuracy and speed. It features a very high electron energy of up to 100 keV (resulting in reduced scattering) to create narrow but tall structures (Figure 1) – like a hot knife cutting through a piece of butter. Steered by a programmable pattern generator, virtually any design can be written, providing ultimate flexibility for the fabrication of prototypes for research. For example,

Figure 1: **New ultra-high-resolution electron-beam lithography system (left). The system is used for writing complex nano structures, e.g. split-ring resonators consisting of narrow but tall gold shapes, which exhibit extraordinary optical properties (right). Line width: 60 nm, height: 1000 nm. Sample made by S. Gorelick.**

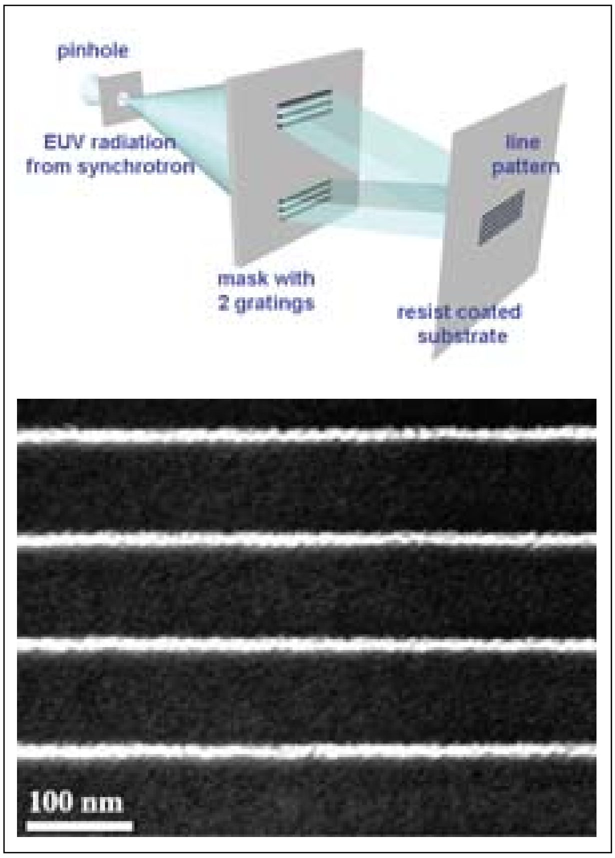


Figure 2: **The EUV-IL station installed at the SLS uses holographic grating masks for ultra-high-resolution exposures in the EUV range (top).**
10-nm-wide zinc-oxide nanowires created by EUV-IL (bottom). Sample made by V. Auzelyte.

diffractive X-ray lenses made by LMN have recently led to unrivalled resolution in X-ray microscopy [2].
Due to its sequential nature of writing, electron-beam lithography is intrinsically slow, making it inefficient for the mass production of nanostructures. However, it is often the originating technique for templates and masks, which can be replicated in a much faster and parallel fashion.

Nano-printing versus nano-writing

Feynman already proposed the replication of nanostructured masters by imprinting them into a polymer layer. Today, half a century later, this method is applied in many laboratories, including at PSI [3]. Masters are generated using our new e-beam writer, and a start-up named EULITHA serves the high demand of customers from around the world for high-quality nanolithography stamps.
To go even beyond the resolution limit defined by the master structures, PSI has pioneered a novel lithography approach: Extreme UV Interference Lithography (EUV-IL) uses synchrotron-generated EUV light at 13.5 nm wavelength and holographic gratings written by an electron beam. The first EUV-IL tool, named XIL-I and developed over the past few years at PSI, has been extensively used for both scientific and commercial applications. EUV-IL is used for the patterning of periodic nanostructures over large areas in a parallel process, resulting in a much higher throughput than electron-beam lithography. In addition, it outperforms e-beam lithography in terms of resolution, as the structures produced are a factor of two finer than mask structures. With this method, a world record in resolution for photolithography was obtained, producing a grating with 11 nm lines/spaces in resist [4]. In addition to the standard lithographic method of resist exposure and pattern transfer, functional nanomaterials, such as ZnO nanodots and nanowires, can be obtained directly by EUV-induced lithography (Figure 2). ZnO nanostructures, which are interesting for optical applications, have been synthesized using chemical methods, whereas we are now able to do the same with top-down lithography, which allows precise positioning, better size control and integration into hierarchal devices. Industrial research with EUV-IL focuses mainly on the evaluation of novel photoresists for the production of future-generation computer processors and memory chips.
Owing to the great success of XIL-I, which has been operating as a branch of the SIS beamline with 15% beam-time share, SLS has decided on a significant upgrade of this beamline. The upgrade consists of the installation of a new undulator and an on-site clean-room facility. XIL-II will serve industrial and academic research with higher beam-time availability and better performance.
Thanks to these two new patterning tools, PSI is now hosting cutting-edge technology in e-beam lithography and a world-leading tool for photon-based lithography. The sub-10 nm regime, which has been the domain of bottom-up approaches, is clearly within reach of top-down lithography, opening up new opportunities. This puts us in an excellent strategic position to significantly advance nanoscience and technology, which will have a significant impact on our future world. We come to the conclusion that there is ***still*** plenty of room at the bottom.

References

[1] We recommend reading this lecture that is still full of inspirations: http://www.zyvex.com/nanotech/feynman.html
[2] J. Vila-Comamala et al., Ultramicroscopy **109** 1360 (2009).
[3] H. Schift, J. Vac. Sci. Technol. B **26** 458 (2008).
[4] V. Auzelyte et al., J. Micro/Nanolith. MEMS MOEMS **8** 021204 (2009).

Three-dimensional structure of a Vascular Endothelial Growth Factor receptor signalling complex

Andrea E. Prota, Kaisa Kisko, Maurice Brozzo, Kurt Ballmer-Hofer, *Biomolecular Research, PSI;* Veli-Matti Leppänen, Michael Jeltsch, Andrey Anisimov, Kari Alitalo, *Molecular Cancer Biology Program, Biomedicum Helsinki, Department of Pathology, Haartman Institute and Helsinki University Central Hospital, University of Helsinki, Finland;* Nisse Kalkkinen, Adrian Goldman, *Institute of Biotechnology, University of Helsinki, Finland,* Tomas Strandin, Hilkka Lankinen, *Haartman Institute, University of Helsinki, Finland*

Vascular Endothelial Growth Factors (VEGFs) regulate blood and lymph vessel formation through activation of specific cell surface receptors. After ligand binding to the extracellular domain, VEGF receptors (VEGFRs) are dimerized and activated. The crystal structure of the ligand binding domain of a VEGF/VEGFR complex reveals the molecular details of this high-affinity interaction. Together with a structure of the entire extracellular receptor domain, these data allowed the mechanism of receptor activation to be deciphered. This information will be useful in the development of new drugs aimed at blocking aberrant vessel formation in disease.

Vascular Endothelial Growth Factors regulate the development of blood and lymphatic vessels

The formation of blood and lymphatic vessels in multi-cellular organisms is orchestrated by the interplay between a plethora of hormone-like growth and differentiation factors, such as Vascular Endothelial Growth Factors [1]. VEGFs are important for the development of blood and lymphatic vessels in a developing organism. Specific VEGF isoforms are also released by cells in damaged tissues lacking adequate blood supply, and therefore deprived of oxygen and nutrients. In this way, VEGF regulates vessel regeneration and homeostasis.

Aberrant signalling by VEGF receptors is associated with several diseases

Aberrant activation of VEGF receptors (VEGFRs) or excessive expression of VEGF leads to pathological vessel growth in diseases such as rheumatoid arthritis, atherosclerosis, macular degeneration, or diabetic retinopathy. New vessel formation is also a hallmark of cancer lesions, where nutrient and oxygen supply and the removal of cellular degradation products are essential for tumour cell growth. It is well established that tumours which are unable to promote vessel formation will not grow beyond the size of a few millimetres and will not invade surrounding tissue [2]. Such tumours assume a dormant state not manifested by disease.

The activity of VEGF is easily observed in the model system shown in Figure 1. VEGF applied to the surface of the chick chorioallantoic membrane – the 'primordial' lung of the chick embryo developing in the egg shell – promotes vessel formation, while neutralizing VEGF-specific antibodies completely block vascularization [3]. This concept is exploited in new therapeutics applied in ocular disease, such as macular degeneration, and in tumour therapy [4].

Structural analysis of a VEGF-C/VEGFR-2 complex

To gain insight into receptor function and specificity of VEGF family proteins, and to analyze the mechanism of receptor activation, we have determined the structure of a VEGF ligand/receptor complex. VEGF-C, essential for lymphangiogenesis,

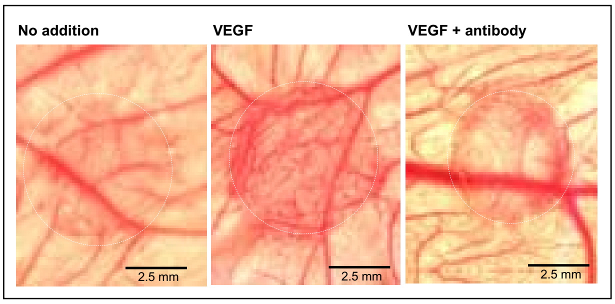


Figure 1: **VEGF applied to the chorioallantoic membrane of a chick embryo promotes vessel growth (middle panel), while VEGF neutralization with a VEGF antibody blocks this process (right panel [3]).**

Figure 2: **Structure of the ligand binding domain of VEGFR-2 (in yellow and red) consisting of subdomains 2 and 3 in complex with VEGF-C (in blue and green, V.-M. Leppänen et al., PNAS online 2010, doi:10.1073/pnas.0914318107).**

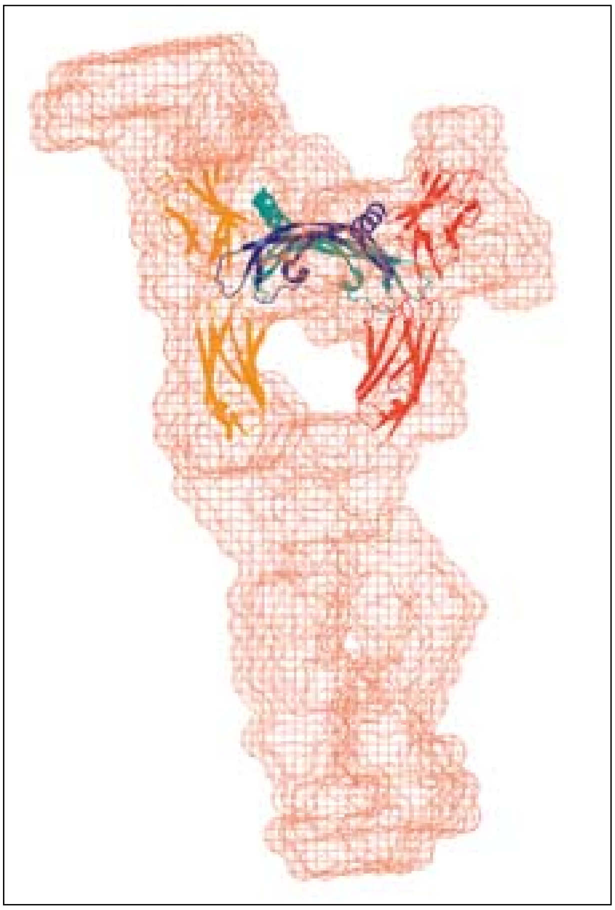


Figure 3: **Model of the entire extracellular domain encompassing all 7 subdomains of VEGFR-2 in complex with VEGF-C. The X-ray structure shown in Figure 2 was fitted into a model derived from solution scattering data obtained with purified receptor/ligand complex [6, 7].**

and the extracellular ligand binding domain of VEGFR-2 were produced in insect cells using the baculovirus expression system. The protein complex was purified by affinity chromatography and its functionality determined biochemically. The complex was crystallized and analyzed at the Swiss Synchrotron Light Source at PSI. Figure 2 shows the structure of the complex. Two receptor proteins and a covalently linked VEGF-C dimer form a 2:2 complex. The high resolution of the protein structure allowed the molecular details of the interactions that form the ligand/receptor binding site to be determined. Figure 3 shows a model of the full-length extracellular domain, consisting of all seven subdomains. The model was built from small-angle X-ray solution scattering (SAXS) data and the high-resolution structure from Figure 2 was fitted into the ligand binding domain.

Conclusions

Drug development is based on two concepts. Traditionally, high-throughput screening programmes have been used to identify chemical compounds interacting with specific molecular targets relevant in a particular disease. Alternatively, a more rational approach is applied, in which structural information for a disease-relevant molecular target is used to develop new, highly specific compounds. Such compounds will be designed to either inhibit or activate the function of the drug target. VEGFs and their receptors have been targeted by several drug companies to interfere with aberrant vessel formation in disease, and a variety of successful drugs which block VEGF action are on the market today. The detailed analysis of VEGFR structures and the understanding of the activation mechanism of this receptor in molecular terms will hopefully contribute to the design of a new generation of receptor antagonists – or agonists. The structure shown here, and a low-resolution structure published earlier [5], open up new possibilities for the rational design of drugs interfering with VEGF binding and receptor dimerization.

References

[1] E. Stuttfeld, K. Ballmer-Hofer, IUBMB Life **61** 915-922 (2009).

[2] J. Folkman, Ann. Surg. **175** 409-416 (1972).

[3] S.M. Zeisberger et al., Br. J. Cancer **95** 272-281 (2006).

[4] J.I. Greenberg, D.A. Cheresh, Expert. Opin. Biol. Ther. **9** 1347-1356 (2009).

[5] C. Ruch et al., Nat. Struct. Mol. Biol. **14** 249-250 (2007).

[6] D. Franke, and D.I. Svergun, J. Appl. Cryst. **42** 342-346 (2009).

[7] M.V. Petoukhov et al., J. Appl. Cryst. **40** s223-s228 (2007).

Hitchhiking through cytoplasmic space

Srinivas Honnappa, Anke Weisbrich, Hatim Jawhari, Ruben Martinez-Buey, Fritz K. Winkler, Michel O. Steinmetz, *Biomolecular Research, PSI; in collaboration with* Susana M. Gouveia, Ilia Grigoriev, Frederik J.A. van Rijssel, Aleksandra Lawera, Anna Akhmanova, *Erasmus Medical Center, Rotterdam, NL;* Fred F. Damberger, Neel S. Bhavesh, Kurt Wüthrich, *ETH Zürich, CH;* Ilian Jelesarov, *University of Zürich*

Microtubule plus-end tracking proteins (+TIPs) are a diverse group of proteins involved in numerous vital cell activities, including cell division and migration, which localize to and track growing microtubule ends. We have delineated the underlying mechanism of this targeting process by identifying a universal microtubule tip localization signal (MtLS) that guides +TIPs to growing microtubule tips and thus enables them to explore cytoplasmic space.

Microtubules are filamentous structures involved in many vital cellular activities. They contain two structurally and functionally distinct ends: slow-growing minus ends and fast-growing plus ends. In cells, microtubule minus ends are stable, whereas microtubule plus ends are highly dynamic and stochastically switch between phases of growing and shortening. The intrinsic dynamic nature of microtubules is central to microtubule function and is tightly regulated, both spatially and temporally, by diverse microtubule-binding proteins. +TIPs are a diverse group of proteins involved in numerous microtubule-based cell activities [1-6]. Recently, it was discovered that end-binding protein 1 (EB1) regulates the interaction of +TIPs with microtubule plus ends, but the mechanism by which this is achieved was unclear. We have addressed this fundamental question by using a multidisciplinary experimental approach.

Four amino acid residues functionally conserved in numerous +TIPs

To investigate the interaction between diverse +TIPs and EB1, we have carried out sequence analysis of +TIPs and identified a four amino acid motif, Ser-x-Ile-Pro (SxIP, where x denotes any amino acid) that was conserved among several +TIPs (Figure 1). Full-length +TIPs and fragments containing SxIP were found to interact with EB1 and to track growing microtubule plus ends in cells (Figure 2A). Changes in the amino acid sequence of SxIP abrogated the process, indicating that this motif forms the basis of the EB1-mediated interaction between +TIPs and microtubule ends (Figure 2B).

Structural analysis of the EB1-SxIP interaction

EB1 harbours an EB homology domain which is known to contain a highly conserved hydrophobic cavity, and the substitution of hydrophobic residues in SxIP with polar ones abolished the interaction between +TIP and EB1 [7, 8]. Based on this, we proposed that SxIP and the hydrophobic cavity of EB1 are the major interacting sites. Indeed, examination of

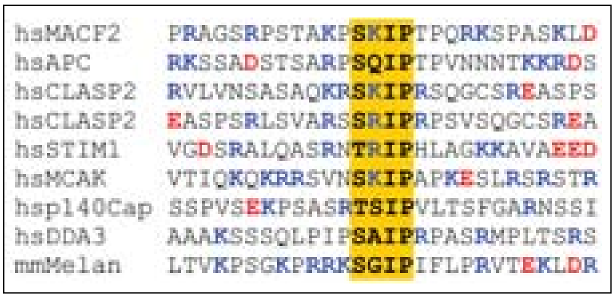


Figure 1: **Sequence alignment of different human +TIPs showing the conservation of the SxIP motif.**

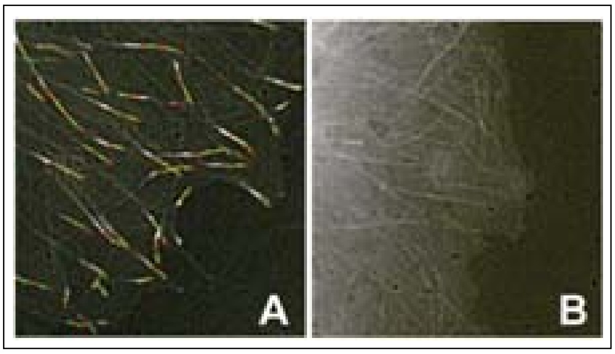


Figure 2: **Live-cell imaging of the wild-type +TIP MCAK (A) and a variant in which the SxIP motif was mutated (B).**

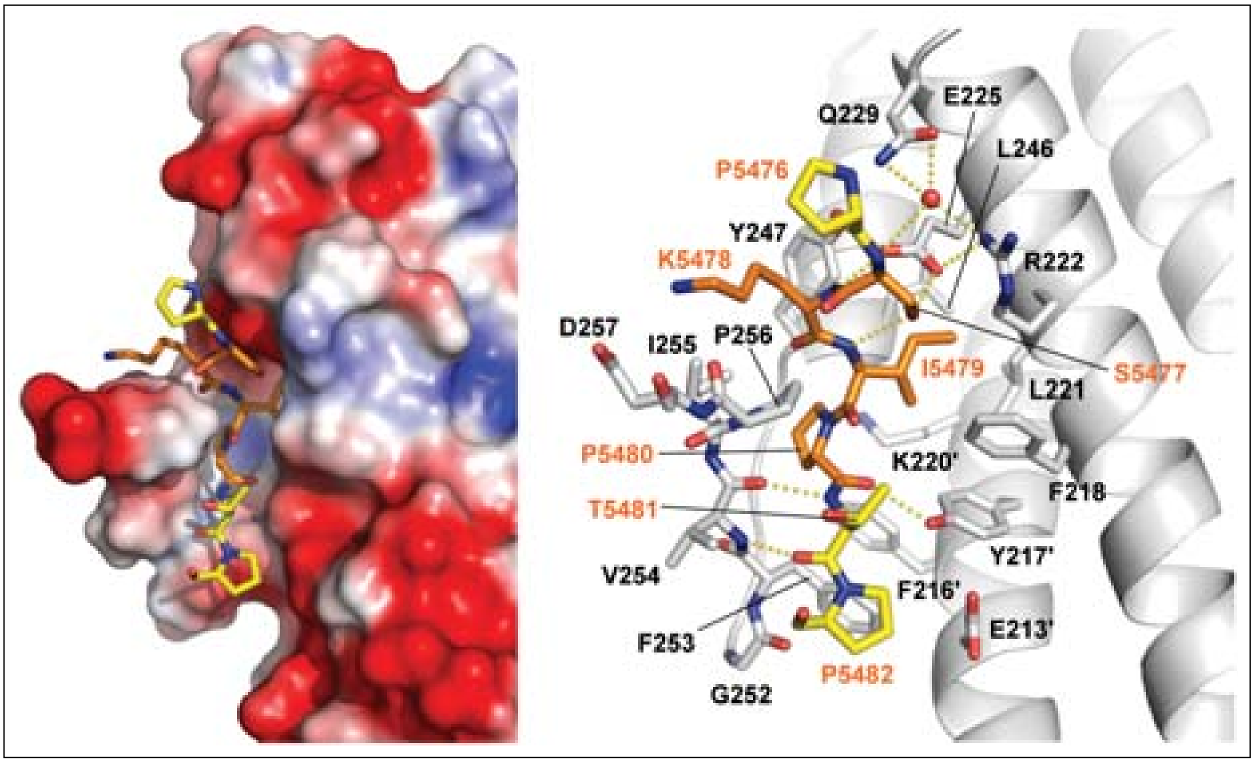


Figure 3: **X-ray crystal structure of the EB1-SxIP interaction. Left panel: EB1 is depicted as surface representation colour-coded with the electrostatic potential; the SxIP motif is shown in a yellow-sticks representation. Right panel: EB1 is depicted as a grey ribbon with interacting side chains represented as sticks.**

the crystal structure of a complex of EB1 and the +TIP microtubule-actin crosslinking factor (MACF) identified contact sites that correspond to the SxIP of MACF and the hydrophobic cavity of EB1 (Figure 3). This finding was extended to other +TIPs using nuclear magnetic resonance studies [7].

Conclusions

Our data reveal that +TIPs bind to the hydrophobic cavity of EB1 through the SxIP motif, and this interaction directs them to microtubule tips, where they can carry out their functions by hitchhiking through cytoplasmic space [7]. Future studies, interfering with this microtubule tip localization signal (MtLS) through amino acid substitutions, will enable further dissection of the role of microtubule tip tracking in vital cellular processes.

References

[1] A. Akhmanova, M.O. Steinmetz, Nature Rev. Mol. Cell Biol. **9** 309-322 (2008).

[2] M.O. Steinmetz, A. Akhmanova, Trends Biochem. Sci. **33** 535-545 (2008).

[3] S.Honnappa, O. Okhrimenko, R. Jaussi, H. Jawhari, I. Jelesarov, F.K. Winkler, M.O. Steinmetz, Mol. Cell **23** 663-671 (2006).

[4] A. Weisbrich, S. Honnappa, R. Jaussi, O. Okhrimenko, D. Frey, I. Jelesarov, A. Akhmanova, M.O. Steinmetz, Nature Struct. Mol. Biol. **14** 959-967 (2007).

[5] I. Grigoriev, S., Montenegro Gouveia, B. van der Vaart, J. Demmers, J.T. Smyth, S. Honnappa, D. Splinter, M.O. Steinmetz, J.W. Putney, C.C. Hoogenraad, A. Akhmanova, Curr. Biol. **18** 177-182 (2008).

[6] Y. Komarova, C.O. De Groot, I. Grigoriev, S. Montenegro Gouveia, L. Munteanu, J.M. Schober, S. Honnappa, R.M. Buey, C.C. Hoogenraad, M. Dogterom, G.G. Borisy, M.O. Steinmetz, A. Akhmanova, J. Cell Biol. **184** 691-706 (2009).

[7] S. Honnappa, S. Montenegro Gouveia, A. Weisbrich, F.F. Damberger, N.S.Bhavesh, H. Jawhari, I. Grigoriev, F.J.A. van Rijssel, R.M. Buey, A. Lawera, I. Jelesarov, F.K. Winkler, K. Wüthrich, A. Akhmanova, M.O. Steinmetz, *An EB1-binding motif acts as a microtubule tip localization signal,* Cell **138** 366-376 (2009).

[8] S. Honnappa, C.M. John, D. Kostrewa, F.K. Winkler, M.O. Steinmetz, EMBO J. **24** 261-269 (2005).

Tumour targeting with radiolabelled Self-Assembling Peptide Nanoparticles

Elisa Garcia Garayoa, Olga Gasser, Alain Blanc, Roger Schibli, *Center for Radiopharmaceutical Science ETH-PSI-USZ;* Christian Mittelholzer, Ueli Aebi, *ME Müller Institute for Structural Biology, University of Basel;* Peter Burkhard, *Alpha-O-Peptides AG, Allschwil*

The special characteristics of the tumour vasculature allow preferential accumulation of polymeric drugs and nanoparticles in the tumour tissue. Conjugation of nanoparticles with peptides that bind to receptors overexpressed on tumour cell membranes, such as Bombesin (BBS), or tumour vasculature, such as RGD, renders them highly specific and may increase significantly their potential as tumour-targeting agents for cancer diagnosis and therapy.

The lack of selectivity of anticancer drugs and their collateral side effects on normal cells are serious limitations in current cancer chemotherapy. The development of more selective delivery systems for cancer diagnosis and therapy is therefore one of the most important goals of anticancer research. The application of nanotechnology to healthcare was initially focused on improving the properties of already available therapeutic and diagnostic modalities. More recently, efforts have been dedicated to the development of entirely novel therapeutic and diagnostic approaches [1-3]. A critical point for the use of nanoparticles in cancer imaging and/or treatment is their ability to specifically target cancerous tissue.

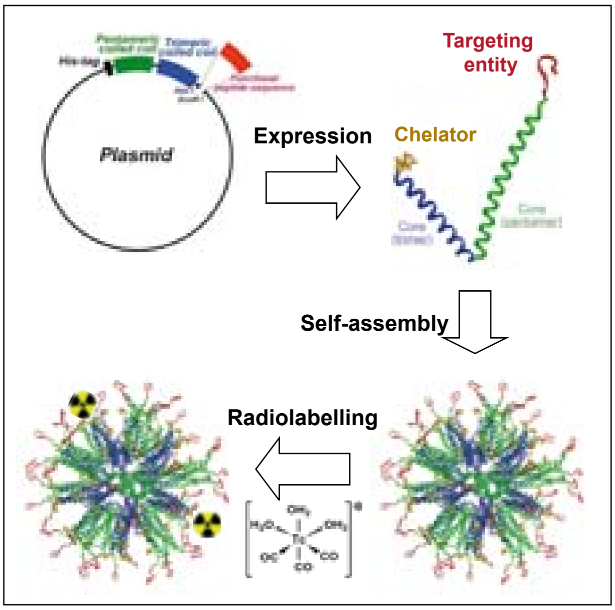


Figure 1: **Schematic representation of SAPN synthesis and radiolabelling.**

Peptides are interesting molecules that bind to receptors overexpressed on the tumour cell membrane or on the tumour vasculature during neoangiogenesis [4, 5]. Hence, conjugation of peptides to nanoparticles renders the latter highly specific and may increase significantly their potential as tumour-targeting agents for cancer diagnosis and therapy. Bombesin (BBS) receptors are overexpressed in most prostate and breast cancer cells and integrin receptors are highly expressed during neoangiogenesis. Several constructs have been cloned, expressed and purified. One of them showed highly improved nanoparticle formation and allowed highly homogeneous preparations to be achieved that are less prone to aggregation and easier to handle for further chemical modifications and radiolabelling (Figure 1). We have prepared self-assembling peptide nanoparticles (SAPN) with different ratios of targeting peptide (BBS, RGD or both). The new SAPN conjugates were successfully labelled with ^{99m}Tc and evaluated *in vitro* and *in vivo.*

Cell binding

In vitro tests with ^{99m}Tc-labelled SAPNs were performed in intact human prostate cancer PC-3 cells. Binding to tumour cells increased with time for all the SAPNs. It was slower in the first few hours for the native SAPN (non-targeted) and the SAPNs with 2 and 5 BBS residues. The targeted SAPNs with 10 or more BBS sequences, as well as with RGD, showed faster binding in the first 4 hours. No changes were observed at longer incubation times (Figure 2). In all cases, most of the radioactivity associated with the cells was located inside them, since less than 15% of bound radioactivity was recovered

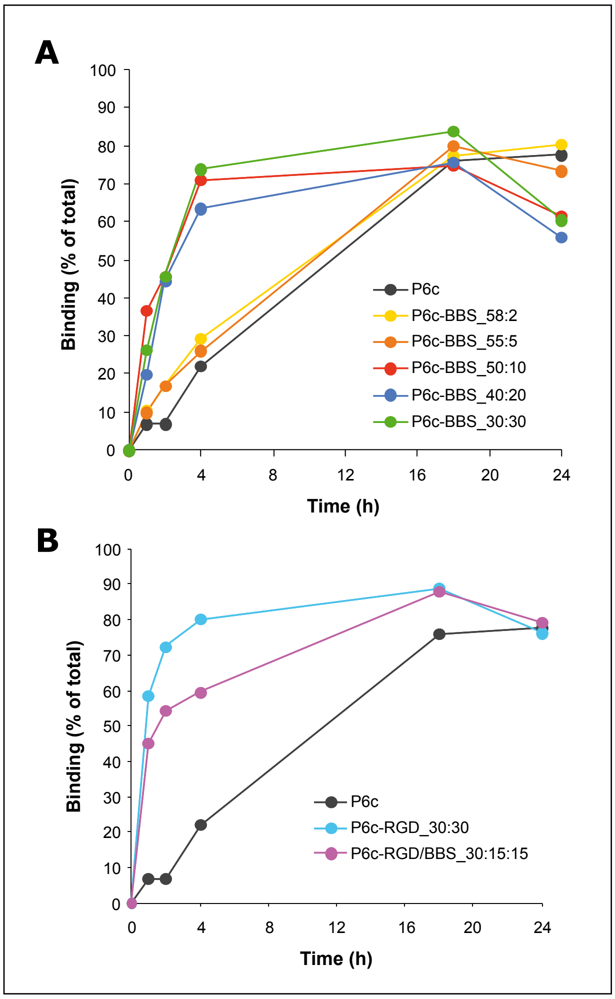


Figure 2: **Comparison of the binding of the ^{99m}Tc- SPANs conjugated with BBS (A) and RGD (B).**

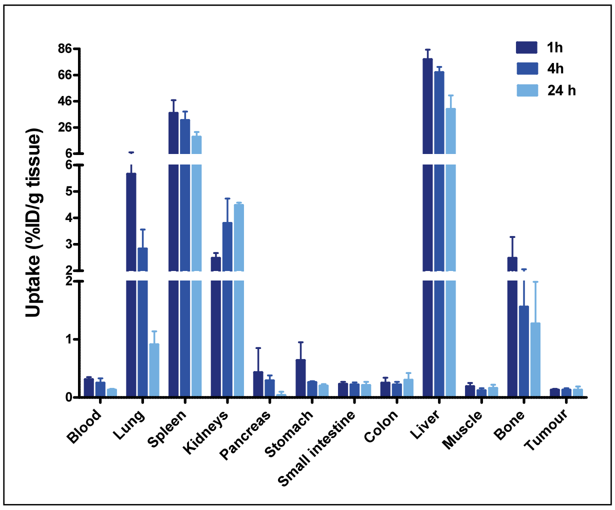


Figure 3: **Biodistribution of ^{99m}Tc-P6c-BBS_50:10 (SAPN with 10 BBS residues) in nude mice with PC-3 tumour xenografts (75 kBq/mouse i.v.).**

by acid wash (membrane-bound activity). The native SAPN was also taken up by the cells, most likely through a mechanism not involving peptide receptors. The fact that the binding could be inhibited by about 70% with the non-targeted SAPN (10 µg/mL), whereas only by 10 to 20% with cold peptide (10 µM), shows that the main mechanism of endocytosis is not the classical clathrin-dependent receptor-mediated pathway.

Biodistribution

In first *in vivo* studies in mice bearing PC-3 tumour xenografts, tumour uptake was low at all post-injection (p.i.) times tested, which can be partially explained by a fast clearance of the tracer from the blood pool (< 0.5 % ID/g at 1h p.i.). This rapid blood clearance may be due to a process of opsonization or removal by the mononuclear phagocytic system (MPS) [6, 7]. The sequestration of nanoparticles by reticuloendothelial system (RES) organs is very rapid and concentrates in the liver and spleen, which is consistent with our data and would explain the high radioactivity found in the liver and spleen at all p.i. times tested (Figure 3).

The addition of PEG (PEGylation) to the surface of nanoparticles has been successfully used to increase their blood circulation half-life [8, 9], which is important. PEGylation helps to create a hydrophilic protective layer around the nanoparticles that is able to repel the absorption of opsonin proteins via steric repulsion forces. Lower opsonization will result in increased residence time in blood, lower uptake in RES organs and higher accumulation in the target tissue. The most promising SAPNs will be PEGylated and further tests will be carried out to evaluate the influence of PEGylation on the biodistribution and tumour targeting potential after radiolabelling.

References

[1] I. Brigger, C. Dubernet, P. Couvreur, Adv Drug Deliv. Rev. **54** 631 (2002).
[2] M. Ferrari, Nat Rev Cancer **5** 161 (2005).
[3] V.P. Torchilin, Adv Drug Deliv Rev. **58** 1532 (2006).
[4] C.R. Cooper, C.H. Chay, K.J. Pienta, Neoplasia **4** 191 (2002).
[5] S.M. Okarvi, Cancer Treat. Rev. **34** 13 (2008).
[6] D.E. Owens, N.A. Peppas, Int. J. Pharm. **307** 93 (2006).
[7] F. Alexis, E. Pridgen, L.K. Moluar, O.C. Farokhzod, Mol. Pharm. **5** 505 (2008).
[8] G. Gaucher, K. Asahina, J. Wang, J.C. Leroux, Biomacromolecules **10** 408 (2009).
[9] Y. Sheng, C. Liu, Y. Yuan, X. Tao, F. Yang, X. Shan, H. Zhou, F. Xu, Biomaterials **30** 2340 (2009).

Clinical pilot study with a novel, radiolabelled vitamin B_{12} derivative

Robert Waibel, Christine de Pasquale, Peter Bläuenstein, P. August Schubiger, Roger Schibli,
Centre for Radiopharmaceutical Sciences, ETH-PSI-USZ; Irene Burger, Niklaus Schäfer, *Division of Oncology, USZ (University Hospital Zurich)*

Vitamin B_{12} is essential for life. Rapidly growing cells show an increasing demand for nutrients and vitamins. The objective of our work was to exploit the supply route of vitamin B_{12} to deliver new derivatives of this vital vitamin to hyperproliferative cells. We have identified transcobalamin I on tumours as a possible new receptor for a preferential accumulation of vitamin-mediated targeting. The low systemic distribution of radioactivity and the high tumour-to-blood ratio opened up the possibility of a successful clinical application of vitamin B_{12} for imaging or therapy.

Starting in 2002, we undertook a new effort to improve targeting of radiolabeled vitamin B_{12} to tumours with different analogs (derivatization at the ribose part, the cyanide ligand, or use of a more stable chelating system), but failed initially to decrease high kidney and liver uptake due to the intrinsic tendency of vitamin B_{12} to be stored in these organs [1-7].
Another approach was therefore required to interfere with the storage function of these organs. For clinical application of radiopharmaceuticals, it is known that high kidney uptake of radiolabelled compounds may lead to radiation toxicity. Since the radiation dose to the kidney is often the dose-limiting factor for application of radiopharmaceuticals, we set out to investigate the possibility of preventing high organ uptake by disrupting the binding of vitamin B_{12} to its transport protein TCII, and therefore inhibiting uptake mediated by the receptors TCII-R and megalin. By abolishing the binding of vitamin B_{12} to TCII, a decreased non-targeted organ uptake can be expected. Furthermore, by interfering with the binding of vitamin B_{12} with circulating TCII, radioactive vitamin B_{12}, being a small molecule, cleared much faster from the blood than protein-bound vitamin B_{12}, resulting in lower systemic toxicity [8].
Vitamin B_{12}-PAMA(4) was radiolabelled with 99m-Technetium and the IsoLink™ kit which was developed and patented in a collaboration between PSI and Covidien Inc. Radiochemical purity after HPLC was >95%. Biodistribution studies were performed in vitamin B_{12}-free feed mice bearing various syngenic and xenogenic tumours (e.g. melanoma, bladder, pancreas, renal, colon and prostate carcinoma) (Figure 1). In mice, vitamin B_{12}-PAMA(4) accumulated specifically in tumours (except colon and prostate carcinoma). Fast renal excretion

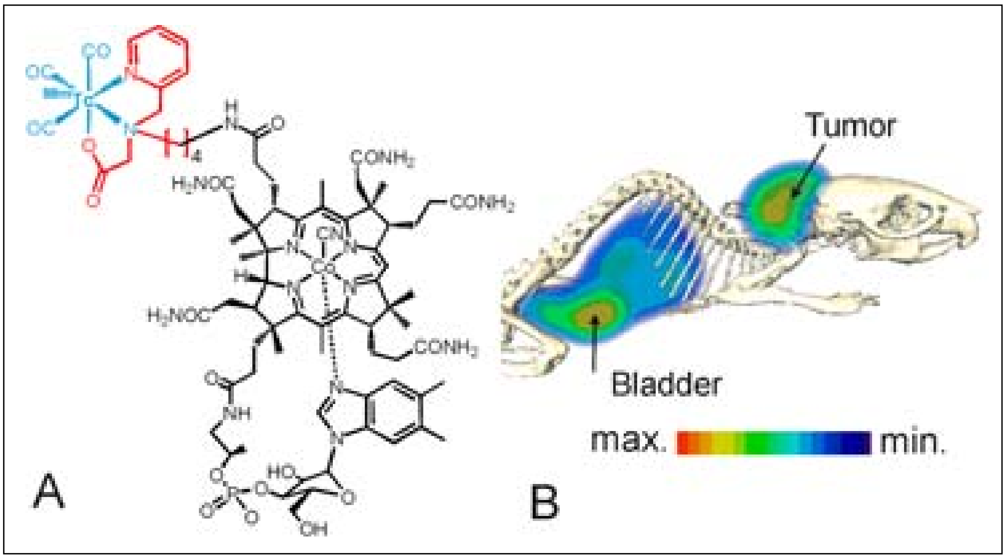


Figure 1:
(A) Structure of vitamin B_{12}-PAMA(4) technetium derivative.
(B) SPECT/CT scan of a mouse carrying a tumour at the neck, 24h after i.v. injection of (A).

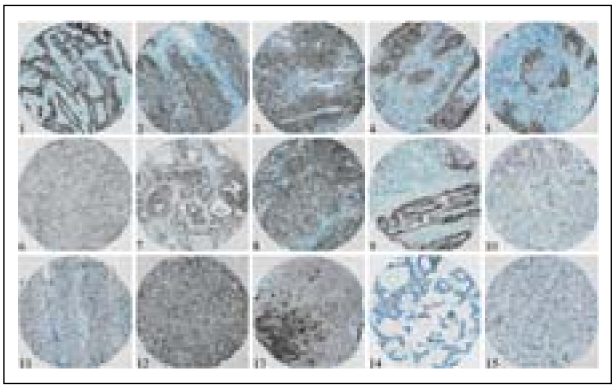


Figure 2: **TCI expression of different tumour tissue was shown by immunohistochemistry with a polyclonal anti-TCI antibody (brown). The cell nuclei were stained with haematoxylin (blue).**

Figure 3: **Radiolabelling of our vitamin B_{12}-PAMA(4) under GMP conditions.**

and low uptake in the liver and the glands were observed, which was attributed to the abolished binding to TCII. We identified transcobalamin I (TCI) in the mouse model and on human tumour tissue as the target of our vitamin B_{12}-PAMA(4) derivative (Figure 2).

Based on these encouraging data, we initiated the production of our lead compound vitamin B_{12}-Pama(4) according to GMP (Good Manufacturing Practice) standards (Figure 3). Approval for a clinical study was obtained by Swissmedic, BAG (the Swiss Federal Office of Public Health) and the ethical commission and, in late 2008, a clinical pilot study could be initiated at the University Hospital in Zurich (USZ, Dept. of Oncology and Nuclear Medicine). Until the end of 2009, seven patients with various cancer types (e.g. bronchial, mesopharyngeal, colorectal and prostate carcinomas) had been included in the study. Patients had no dietary restrictions before and during the study.

Fast and efficient renal elimination was also observed in the patients. However, vitamin B_{12}-PAMA(4) revealed significant uptake in the livers of all patients. Good tumour uptake was observed in patients with bronchial and mesopharyngeal

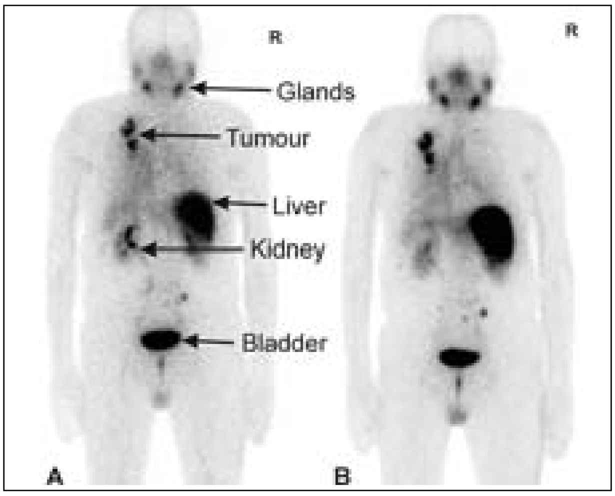


Figure 4: **SPECT image $_{12}$ min (A) and 1h (B) after i.v. injection of radiolabelled vitamin B_{12}-PAMA(4) in a patient with bronchial carcinoma.**

carcinomas (Figure 4). These good results in patients confirmed the results obtained in animals and will help us find an industrial partner for further clinical studies (multi-centre study) which are beyond our capacity.

Conclusion

Vitamin B_{12}-PAMA(4) showed good tumour targeting capacity in certain types of carcinomas. Due to the abolishion of TCII binding, fast and efficient renal elimination in the mouse model was observed, as well as in patients, which is a distinct advantage compared to other vitamin B_{12} derivatives. The high liver uptake in patients was unexpected and is the subject of ongoing investigations.

References

[1] A. Stichelberger, R. Waibel, C. Dumas et al., Nuc.Med.Biol. **30** 465 (2003).
[2] D.R. van Staveren, R. Waibel, S. Mundwiler et al., J. Organomet. Chem. **689** 4803 (2004).
[3] S. Kunze, T. Zobi, P. Kurz et al., Angew. Chem. Int. Ed. **43** 5025 (2004).
[4] D.R. van Staveren, S. Mundwiler, U. Hoffmanns et al., Org. Biomol. Chem. **2** 2593 (2004).
[5] D.R. van Staveren, P.D. Benny, R. Waibel et al., Helv. Chim. Acta. **88** 447 (2005).
[6] S. Mundwiler, R. Waibel, B. Spingler et al., Nuc. Med. Biol. **32** 473 (2005).
[7] B. Spingler, S. Mundwiler, P. Ruiz-Sanchez et al., Eur. J. Inorg. Chem. **18** 2641 (2007).
[8] R. Waibel, H.J. Treichler, N.G. Schaefer et al., Cancer Res. **68** 2904 (2008).

Low-alpha operation of the SLS storage ring

Michael Böge, Natalia Milas, Andreas Streun, *Department of Large Research Facilities, PSI*

Recently, the Swiss Light Source (SLS) storage ring was operated at low momentum compaction factor α. The motivation for setting up this mode of operation was the demand by SLS users performing time-resolved experiments for a substantial X-ray flux at a pulse length of a few picoseconds rms. This mode is also interesting for THz experiments due to the high yield of coherent radiation. In the new low-α mode, the total stored current is 50 mA, distributed over 390 bunches of 8 ps rms length, a factor 5 smaller than in normal operational mode.

Low-α mode lattice set-up

Electrons circulating in a storage ring do not all have exactly the design energy E_0, but deviate by small amounts ΔE, which are Gaussian distributed due to synchrotron radiation effects. If a particle has a positive energy deviation $\Delta E > 0$, it will take a wider curve in the bending magnets of the storage ring, and thus the length of its path for one roundtrip will be longer by some amount ΔL compared with the ring circumference L_0 defined for the design energy E_0. The momentum compaction factor α connects the relative variation of path length to the relative energy deviation by the relation:

$$\Delta L/L_0 = \alpha_1 \cdot \Delta E/E_0 + \alpha_2 \cdot (\Delta E/E_0)^2 + \ldots$$

The interplay of the energy dependence of path length, and with it the roundtrip time, with the time-dependent accelerating voltage of the storage ring's radio-frequency cavities ensures longitudinal stability of motion and leads to the formation of particle bunches. The length of these bunches is mainly determined by the linear momentum compaction factor, which is proportional to the square root of α_1. The value of α_1 can be adjusted by modification of the dispersion function of the storage ring lattice, which is achieved by setting the quadrupole currents appropriately.

The idea behind the low-α mode is to set a lower value of α_1 and thus make the particles' path length almost independent of energy. As a consequence, the bunch length is reduced; however, the longitudinal stability is reduced as well and non-linear effects due to quadratic (α_2) and higher-order terms of momentum compaction and instabilities become more apparent.

The SLS storage ring has a circumference of 288 m and operates at 2.4 GeV. In normal operation mode, the lattice provides an emittance of 5.5 nm. A linear momentum compaction of $\alpha_1 = 6.5 \cdot 10^{-4}$ results in a bunch length (in time) of 16 ps rms (or 5 mm long). In standard 400 mA top-up user operation, the bunch length is increased on purpose to about 40 ps rms (bunch train average) by means of 3rd harmonic Landau cavities, in order to suppress instabilities and increase beam lifetime.

The low-α optics provides a linear momentum compaction of $\alpha_1 = 5.3 \cdot 10^{-5}$, corresponding to a natural bunch length of 4 ps. The emittance for this optics is larger than in normal operation and amounts to 13 nm.

The quadratic term α_2 is controlled by sextupoles in lattice regions with non-zero dispersion function. Since SLS has three such sextupole families, and only two of them are required to adjust the chromaticity, α_2 could be tuned using the third family. It was set to the lowest possible value (considering the sextupole current range) of $\alpha_2 = 1.84 \cdot 10^{-3}$, since a large value reduces the longitudinal acceptance and the orbit stability.

Injection efficiency and orbit correction

In normal operation, the injection efficiency from the booster synchrotron to the SLS storage ring is close to 100%. In low-α mode, however, the longitudinal acceptance is reduced and the storage ring cannot completely capture the electron bunch delivered by the booster synchrotron, which has an rms length of about 20 mm, or 67 ps. Calculations predicted that 46% of the incoming bunch would be captured by the low-α lattice. The measured value of 40% is very close and gives good agreement between the real lattice and theory.

Initially, the usual orbit correction scheme did not converge for the low-α case, due to the non-linearity and sensitivity of the beam energy to changes of radio-frequency $\Delta f/f = -\Delta L/L$ for low α_1. Instead, we measured the energy offset to be cor-

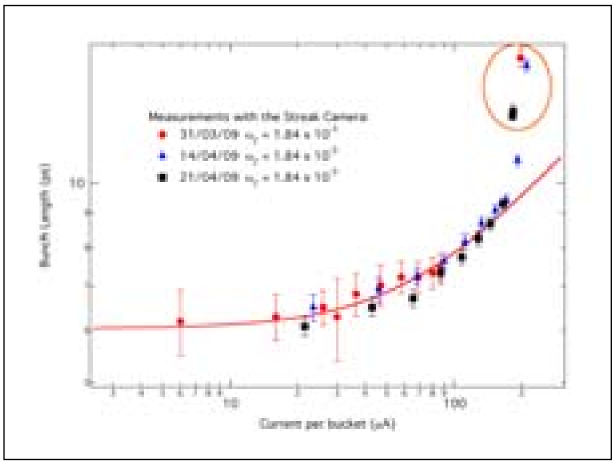


Figure 1: **Bunch length as a function of current per bucket. The red full line is a fit of the empirical 3/8-power law to the data. For currents around 200 μA/bucket, the bunch length deviates from the empirical function as shown by the data points within the circle.**

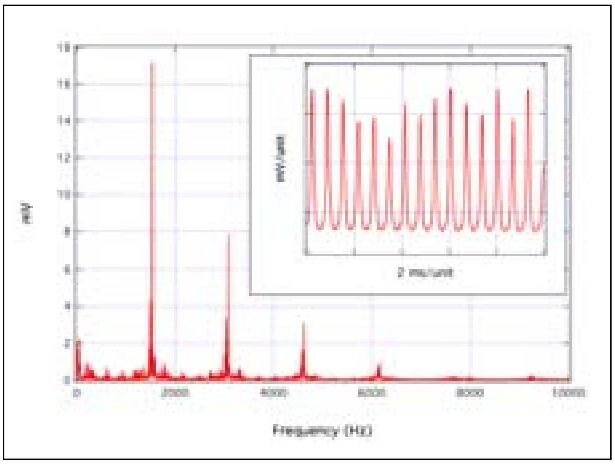


Figure 2: **Bursts of coherent THz radiation appear in the beam spectrum at the synchrotron frequency of the low-α mode of 1.681 kHz. The inset shows the time signal. The current was 183 μA per bunch.**

rected ($\Delta E/E_0$) from a dispersion fit to the orbit, calculated the required frequency shift (Δf) for correcting the momentum, and then applied a step-by-step correction, without frequency correction, for the remaining orbit distortion. This was iterated until the frequency change increments became sufficiently small that the slow orbit feedback started to converge again. After fixing the problem related to the non-linear Δf ($\Delta E/E_0$) dependency, the theoretical values for α_1 and α_2 could be used to correct large initial orbit distortions. Finally, the fast orbit feedback system could be put into operation.

Characterisation of the low-α mode

We carried out a series of measurements to characterise the mode implemented in SLS, using the theoretical value of α_2 to obtain α_1 from measurements of synchrotron tune and orbit displacement versus RF frequency [2]. We calculated $\alpha_1 = (3.6\pm0.2)\cdot10^{-5}$, which is reasonably close to the expected value of $5.3\cdot10^{-5}$, considering the very small values.

The bunch length was measured as a function of the stored current per bunch. Results are shown in Figure 1, where the red solid line is fitting to the data using an empirical formula in which the bunch length scales with the current to a power of 3/8 [3]. The onset of turbulent bunch lengthening is at about 50 μA per bunch; at currents higher than 200 μA per bunch we also observed a fast instability ("outlier" points circled in Figure 1).

Spectra of coherent THz radiation were taken at the infrared beamline for the series of 21 April 2009 (cf. Figure 1). The integrated intensity revealed a quadratic dependence on current up to 60 μA per bunch; above, it rose faster, which we believe to be due to a deviation from the Gaussian distribution of charge in the bunch extending coherent THz radiation to higher frequencies. For currents above 180 μA, bursts of coherent THz were observed (cf. Figure 2), which indicate the formation of microstructures in the electron bunch [4]. The bursting peaks appear at a frequency of 1.681 kHz, which is identical to the measured synchrotron frequency. These bursts deliver very intense coherent THz radiation, however not in a controlled manner, as has been previously observed at other light sources operating in low-α mode.

Performance results

After characterising the low-α mode, we established the standard "SLS low-α user mode" with 50 mA total stored current distributed in 390 bunches. In this mode, the bunch length is 8 ps, as requested by the users. This was verified by streak camera measurements and by scanning the bunch using laser-beam slicing at the SLS FEMTO beamline. For the 2010 run, two sets of 7 shifts each are scheduled for low-α operation at the SLS.

References

[1] D. Robin, E. Forest, C. Pellegrini, A. Amiry, Phys. Rev. E **48** (3) 2149 (1993).

[2] D. Robin et al., *Low alpha experiments at the ALS,* Internal report LBL-37802, Berkeley (1995).

[3] J. Feikes, K. Holldack, P. Kuske, G. Wüstefeld, *Sub-picosecond bunches in the BESSY storage ring,* EPAC'04, Lucerne, 1954 (June 2004).

[4] C. Biscari (ed.), *CSR in storage rings,* ICFA beam dynamics newsletter No. 35 (2004).

Expansion based on continuity: Technology projects in proton therapy justified by clinical results

Eugen Hug, Christian Bula, Gudrun Goitein, David Meer, Eros Pedroni, Jorn Verwey, *Center for Proton Therapy, PSI*

Analysis of long-term clinical results of proton irradiation for deep-seated tumours has proven the safety and efficacy of spot-scanning-based proton therapy at PSI. The implementation phase of Gantry 2 and the next-generation scanning system has continued, and the new treatment unit for eye tumours (OPTIS2) was successfully commissioned, allowing transfer of OPTIS to OPTIS2 during the coming year.

The year 2009 marked the second year of patient treatment at CPT after the start-up of the dedicated cyclotron, during which 116 patients were treated at Gantry 1, again setting a new record high. The clinical programme continued its major emphasis on difficult-to-treat tumours at the skull base, tumours next to the spinal cord and tumours in infants and children. The reliability of the overall system, i.e. from accelerator to patient treatment, proved again to be remarkably high. On the other hand, the difficulties of keeping the OPTIS programme running (224 patients treated in 2009) based on the aged Injector 1 proved the need and urgency to complete the transfer to the new OPTIS 2 treatment unit, connected with the cyclotron COMET.

As enthusiasm for spot-scanning-based particle therapy continues worldwide, and as other centres implement first-generation systems, the issue of the "safety and efficacy" of spot-scanning-based proton therapy, compared with the historically used passive scattering technology, becomes of paramount importance. Only PSI is presently able to provide these important clinical data, with 517 patients having been treated on Gantry 1 from 1996 to October 2009. Until 2007, patient numbers were limited and only rose slowly, from 9 to 50 patients per year. After the dedicated cyclotron had become operational in 2007, these numbers jumped from 59 in 2007 to 106 in 2008 and 116 in 2009. About 70% of patients were treated for cancer of connective tissues (e.g. muscles or bones), called "sarcomas". Another large subgroup was tumours of the brain (20%).

At present, we have follow-up information about tumour status on over 300 patients more than 2 years after proton therapy and on over 250 patients after 4 years. At present, over 130 patients have been analyzed, providing first "long-term" data that are customarily quoted as "actuarial 5-year outcomes data". Our data provide the medical evidence for the "safety and feasibility" of spot-scanning technology for the clinical indications presently treated at PSI. The research effort at PSI in the field of particle therapy of deep-seated tumours, starting with Pion Therapy in the 1980s, has now come full circle. From initial design and treatment concepts, to early research, manufacturing and clinical implementation, to ultimately routine use and now proof of not only principal, but actual, readiness for widespread clinical implementation, is an outstanding accomplishment by literally one generation of researchers at PSI. The ability to control tumours, and essentially cure patients in many cases in which an actual cure was previously rarely an option, is an extremely satisfying result. However, our experience has also demonstrated that we are indeed "pushing the envelope" of current radiation oncology practice. High-dose precision radiation therapy in close proximity to vital organs still has its inherent risks. A minority of patients experienced severe side effects from treatment, which were not due to mistakes or mistreatment, but rather reflected the inherent risks of any high-precision, high-dose cancer treatment – similar to aggressive surgery. The overall complication rate of 6% in our series is comparable to that of other particle centres. However, it demonstrates that particle therapy has to be conducted with utmost diligence and the highest standards of quality and safety.

We feel therefore encouraged to proceed with the next-generation project of spot scanning, to be realized on the new Gantry 2 system. We will also proceed in the coming years with an in-depth evaluation of other clinical indications for proton therapy.

A Gantry 2 progress report

Progress in the installation and commissioning of Gantry 2 had to cope with limitations in terms of resources and beam time due to the higher priority given to the start-up of patient treatment with OPTIS2. Figure 1 shows the present status of the Gantry 2 area.

A very important achievement for the project has been the consolidation of the concepts for the patient positioning systems for Gantry 2.

The first and most important decision taken was to use a sliding Siemens SOMATOM Sensation Open™ computed tomography (CT) system in the treatment area within reach of the patient table. With this approach, as shown in Figure 2, it will be possible to position the patient directly in the treatment room using one of the most advanced commercially available diagnostic imaging devices. The availability of time-resolved images, with the patient ready in the treatment room, will offer new opportunities for patient setup and for setup of respiratory gating for treating moving targets.

The second important decision was the realization of a beam's-eye-view (BEV) X-ray system for Gantry 2. The innovative layout of Gantry 2 (with double parallel scanning starting upstream of the last 90° bending magnet) makes it possible to take X-ray images in the beam direction simultaneously with the proton beam, with a very large field of view, a feature which is not available with any other gantry design. The idea is to mount an X-ray tube on the top of the last bending magnet. The X-rays are beamed though a hole in the return yoke of the 90° bending magnet and exit the nozzle along the axis of the proton beam. This feature should open the door for developing new and more powerful quality assurance tools for controlling target motion during proton beam delivery. The BEV equipment will also be used for the usual initial patient positioning. Figure 3 shows the mechanical solution for placing the flat panel behind the patient.

The planning for the architectural finishing of the area has been very laborious, mainly from the point of view of optimizing the overall functionality of operating the system with patients, in view of the limited space in the area. A good solution was found in the end, based on the same "Japanese panels" concepts used for Gantry 1 and OPTIS2. The finishing of the area should be completed by the summer of 2010.

The installation of the nozzle and its equipment was undertaken and the beam flux monitors developed in-house, together with the strip monitors delivered by the TERA collaboration, have been installed in dedicated, well-insulated drawers in the nozzle and put into operation. The electronics developed at PSI for the beam flux monitors performs well in terms of linearity and stability. Very precise control for zeroing the pedestal of the monitors was achieved by connecting separate analogue-to-frequency converters to the negative and positive difference between monitor signal and zero reference voltage. In this way, we could start calibrating the dose delivery of Gantry 2 in terms of absolute dose. Figure 4 shows the independence of the dose response to the delivered dose rate.

Figure 1: **Gantry 2 area with table and nozzle.**

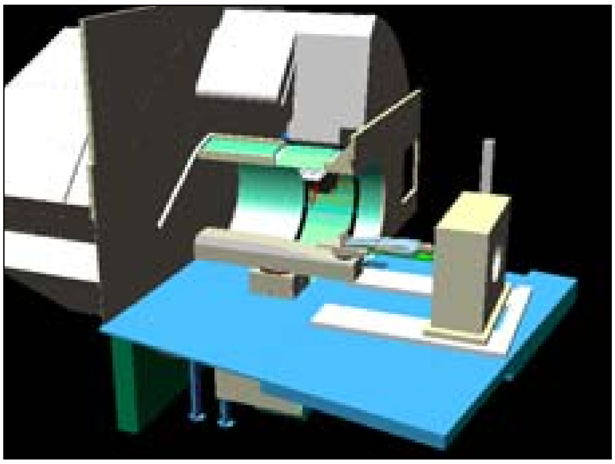


Figure 2: **Patient positioning with sliding CT in the treatment area. The CT moves on rails.**

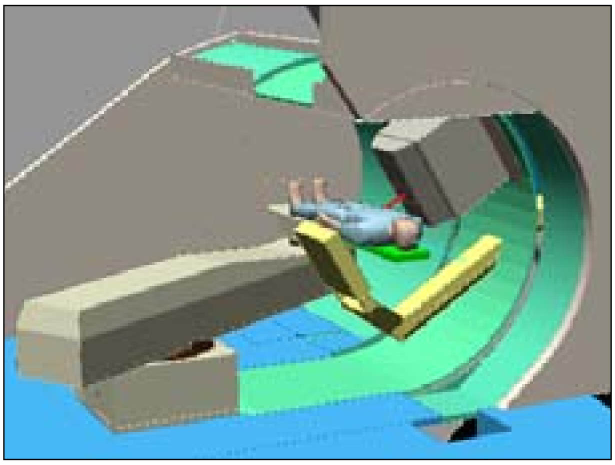


Figure 3: **BEV: the mechanical system (in yellow) brings the flat panel from the parked position at the side of the nozzle to a position behind the patient.**

During 2009 we made significant progress in the development of very advanced beam scanning techniques. The most challenging goal for Gantry 2 is to deliver the dose by painting dose lines with the beam moving at maximum speed, and by

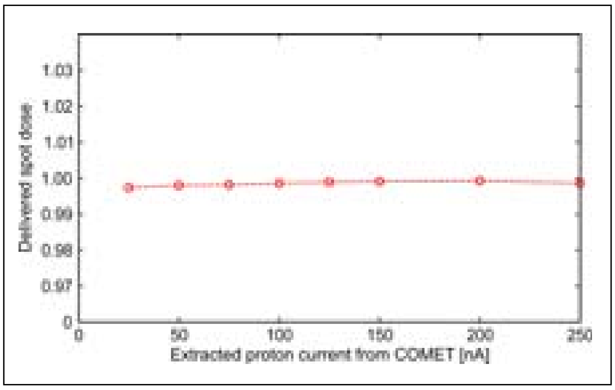


Figure 4: **Normalized delivered spot dose as a function of proton current.**

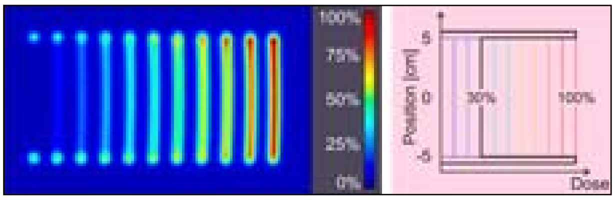


Figure 5: **CCD image of lines with typical dose profiles. The profiles are repainted 23 times with maximum sweeper speed (5.5 ms/line) and intensity modulation.**

shaping the dose by changing the intensity of the beam at the ion source.

Figure 5 shows an image of the dose measured with a scintillating screen viewed by a CCD camera. The vertical lines are 11 cm in length and were delivered in 5.5 ms. This high sweeping speed is needed to achieve a very high repainting number. In order to obtain a high enough dose to make the profile pattern visible, the whole dose image was repeated (cumulated) 23 times.

The intensity of the beam along the lines was controlled with the deflector plate: the first 5 mm at the beginning and the end of the lines was always applied with 100% intensity. In the 10 cm-long central region of the lines, the beam intensity was changed from line to line in steps of 10%. Good control of the intensity of the beam was achieved with a feed-back loop. The difference of the measured signal of monitor 1 to the planned value was fed back as a correction to the deflector plate. This experiment shows that the idea of painting the dose with the beam moving at very high constant speed and applying dose shaping by changing the beam intensity should in principle be feasible on Gantry 2.

The OPTIS2 project

Reliability and maintenance worries concerning the Injector 1 cyclotron, combined with the clinical success of the programme, led to the decision to continue ocular treatment at PSI as the OPTIS2 project. The aims of the project were to develop a patient-friendly and technically modern facility devoted to the treatment of ocular tumours embedded in a multi-treatment room environment, while staying as closely as possible to the beam characteristics of OPTIS. All these aims were realised in 2009.

The project's main technical challenge concerned beam intensity. Degrading protons from 250 MeV to 70 MeV (penetration depth approx. 3 cm) causes more than 99.5% of the protons to be lost in the energy selection process. In order to cap treatment duration to one minute (during which time the patient must actively cooperate, maintaining the required gazing angle), a dramatically more efficient beam-shaping system, as used in OPTIS, had to be designed. Ultimately, a double scattering system with multiple-ring scatter foils, an untried solution for such small fields, was decided upon. Throughout 2009 these multiple-ring foils were produced and commissioned, and the accompanying energy modulation wheels produced and verified (modulator wheels produce the Spread-Out Bragg Peak, which covers the entire tumour region with a homogeneous dose). With a lateral penumbra of 1.6 mm (80–20%) and a distal dose fall-off of 1.5 mm (90–10%) under clinical conditions, the OPTIS beam characteristics were shown to be almost matched (increase of only 0.2 mm) due to the ingenuity of the design of the foils and a successful redesign of the snout, minimising its scattering contribution. Beam flatness and beam symmetry were significantly improved.

In OPTIS2 digital imaging, a parallel robot to position the patient and computer-aided positioning software were introduced and successfully integrated during the first half of 2009. The biggest remaining challenges for 2009, however, were the completion and verification of the control system and the local, patient safety systems (which were designed to be able to start treating a patient without requiring daily verification measurements), and the defining and performing of the QA programme, which assures the efficacy and functionality of all the implemented technical measures to ensure the safety of patient treatment. In June 2009, OPTIS2 was successfully audited by the Swiss Federal Office of Public Health (Bundesamt für Gesundheit – BAG) and a treatment permit obtained after completion of the QA programme by the end of 2009. The first patient was successfully treated in January 2010.

OPTIS – 25 years of ophthalmological proton radiotherapy at PSI

The rationale for the use of protons in radiation therapy is the physical characteristic of the particle beam of having “ballistic" properties when penetrating material. The maximal radiation dose is deposited at the end of a well-defined range in a given human tissue, with a steep dose fall-off afterwards. The eye, as a mobile organ without noteworthy differences in the densities of the various ocular structures, is the most "perfect model" for proton radiotherapy. Tumours arising on the inner surface of the eye can be irradiated with high precision using proton beams. Ocular melanomas represent the largest group of malignancies treated with proton beams. During the past 25 years, PSI has become the most active centre in the world for ophthalmological proton radiotherapy. This excellent service will be maintained by transferring the programme to the new, modernized treatment installation OPTIS2, which is connected to the dedicated medical proton accelerator COMET via a special beam line.

Ophthalmological proton therapy requires baseline procedures that need to be executed before individual planning and the treatment itself can take place. Prior to irradiation, a given tumour base is surgically marked with very small radio-opaque tantalum clips that make the tumour position visible to X-rays. The mobility of the eye allows controlled gazing angles, which are chosen such that the tumour lies on the axis of the incoming proton beam. Individual copper collimators in the beam path right in front of the eye shape the beam laterally. These procedures result in excellent dose conformation.

PSI opened the first ophthalmological proton beam therapy unit in Europe 25 years ago. Between 1984 and 2009, a total of 5300 patients received proton radiotherapy for ocular lesions, the vast majority suffering from choroidal melanoma. A hypo-fractionated treatment schedule, with 4×15 Gy (RBE) on consecutive days, caters for the relative radio-insensitivity of melanomas. The unique spatial dose conformation, sparing the unaffected healthy parts of the eye and limiting the high dose to the eye bulb without penetrating into the central nervous system, is a prerequisite for treatment with these high single doses. Local tumour control is the primary treatment goal, as tumour-specific survival is related to tumour control. Visual acuity after proton irradiation, compared with its status prior to diagnosis, depends on: tumour thickness, the amount of retinal detachment, the distance between tumour and optic disc and/or macula, and the age of the patient. Tumour size and diameter, as well as the distance to the optic disk, affect the enucleation rate, which is caused mainly by the development of glaucoma or loss of ocular function.

Two outcome analyses for large patient numbers (>2000 each) show excellent results in terms of local tumour control, survival, visual acuity and preservation of the affected eye – in analogy to the treatment results of other comparable proton treatment centres worldwide. The important effect of local tumour control on survival is convincing. Tumour-related death

Figure 6: **The OPTIS2 nozzle. The seat is mounted on a parallel robot and the blue squares are integrated flat panels used to position the patients using X-rays.**

(TRD) from ocular melanoma is death from distant metastases. Overall survival rate is 91%, 84% and 80% at 5, 10 and 15 years, respectively, for patients whose tumour remains controlled, whereas the rates decrease to 78%, 61% and 61% at 5, 10 and 15 years for patients who experience a local relapse. Local control rates of 97%, 96% and 94% at 5, 10 and 15 years, respectively, are a "proof of principle" for high-dose, hypo-fractionated irradiation of ocular melanoma. A patient's age and tumour size (thickness and diameter) and its localization and relation to other ocular structures (optic disc, macula, and ciliary body) have the strongest influence on local tumour control, survival, functional outcome and preservation of the eye. Treatment results are excellent compared with most other tumour entities, and PSI has therefore decided to continue the ophthalmological proton therapy programme using the OPTIS 2 facility, which will be operational from spring 2010.

Strategy and highlights of General Energy research

Alexander Wokaun, *General Energy Research Department, PSI*

The year 2009 stands for transition in the General Energy Department. Advanced infrastructure for combustion and electrochemical research was commissioned and is being used in large-scale projects. With a major pilot plant for biomass methanation in operation, preparations were initiated to advance the maturity of other technologies for utilizing renewable energies, including hydrothermal gasification of wet biomass and solar thermal upgrading of carbonaceous waste. A new focus on catalytic processes was defined by reshaping the Laboratory for Energy and Material Cycles (now: Bioenergy and Catalysis), and by creation of the Laboratory for Energy and Environment, operated jointly by the General Energy and Synchrotron Radiation Departments.

The year 2009 will be remembered for profound changes in the global economy – a deep crisis followed by a turn-around in hope for economic recovery. Companies are reshaping their strategies and portfolios to prepare for a new period of more sustainable growth. In such a period, it is important for research to prepare the scientific basis on which this progress needs to be based. In this sense, 2009 has been characterized by the build-up of infrastructure and know-how in the General Energy Research Department that will bear fruit in the years to come.

Negotiations at the Climate Conference in Copenhagen showed general consensus on a climate protection target, but difficulties in agreeing on concrete emission reductions goals. The question of how these reductions would be achieved hardly emerged at the surface of the political discussions. Yet it is concrete measures that will eventually decide on success or failure, and it is here where science and technology can, and must, contribute. In that sense, the three pillars of our strategy – deployment of low-CO_2 energy carriers from renewables, highly efficient conversion to useful energy, and analysis of the societal and environmental demands on a future energy system – are more urgently needed than ever. In the following paragraphs, we shall survey the results in these key areas, while four selected highlights are presented in subsequent contributions (pp. 60–67).

Energy carriers from renewables

Among the choice of renewable primary energies, the Department focuses its efforts on biomass and solar energy. In the case of biomass, methane and electricity are the energy carriers to be produced, favouring high-exergy applications and making use of heat as a by-product. Concentrated solar radiation is used at PSI for producing hydrogen, as well as for upgrading fossil and waste feedstocks with respect to quality and calorific value. Common to both approaches is the goal of using the renewable primary energy to produce clean energy carriers that can be stored, acknowledging the fact that energy storage is considered to be one of the greatest challenges in achieving an efficient energy system.

Energy and Materials Cycles

The 1 MW pilot plant "Methane from wood" went into operation at the beginning of the year, and the technology has been proven over more than 400 hours of operation at this large scale. Accompanying the test phase, PSI researchers have collected invaluable experience on catalyst stability and operational issues. The complementary project "Electricity from wood" was advanced in a laboratory-scale installation at PSI (pp. 60, 61). Trace analytical capabilities for organic compounds and metal species in the hot synthesis gas turned out to be crucial for the design of the process chain.

Green biomass with high water content is converted to methane by hydrothermal processing. To achieve the separation of salts from the feed, which is critical both for continuous reaction and for nutrient recovery, the phase behaviour of salts under near-critical conditions was studied. This approach of using waste biomass (second-generation biofuels) forms the bridge to the SunCHem project, which envisages a closed cycle in which algae are grown in insolated vessels, energy is extracted as methane, and nutrients are recycled.

Use of PSI's large facilities is an enabling competence for this research, highlighted by advances in catalyst characterization by X-ray absorption spectroscopy.

Solar Technology

Solar upgrading of low-quality carbonaceous feedstock was at the centre of a major project of the Laboratory for Solar Technology, as described on pp. 62, 63. In a parallel project for the production of solar hydrogen, we are preparing for a scale-up of the solar zinc oxide / zinc cycle to the 100 kW scale. Exploratory projects target the solar reduction of CO_2, as a mitigation measure, and solar production of energy-intensive raw materials such as aluminium or silicon.

Efficient energy conversion

Efficiency is the key to achieving a more sustainable energy system that respects climate protection goals. Our emphasis is on efficient conversion of fossil fuels in gas turbines and internal combustion engines, and on electrochemical energy storage and conversion for transportation.

Combustion Research

Carbon capture and sequestration may enable the power generating industry to continue using fossil fuels, while reducing CO_2 emissions. In this context, reformed fuel mixtures will be used in gas turbines. Knowledge of the combustion properties of hydrogen-rich fuel gases was advanced by studying combustion fundamentals in the high-pressure combustion test rigs at PSI. In particular, the high flame speed of hydrogen requires special precautions against flashback.
Reaction analysis at the Vacuum Ultraviolet beamline of the SLS supports these efforts, by selective production of combustion-relevant radicals and their spectroscopic characterization.

Electrochemistry

Electric propulsion, both in hybrid cars and in battery-powered electric vehicles, presently receives high attention by the automotive industry. The Battery Group contributes towards this technology by developing novel materials for the positive and negative electrodes of the lithium-ion battery, assembling them into electrodes and testing their high-power capabilities and lifetime.
The complementary approach of using fuel cells as primary converters has seen important PSI contributions towards extension of the operating time by more stable polymer electrolyte membranes, and cost reduction by integrated stack design concepts.
In situ diagnostic methods are guiding these efforts. For the first time, direct current measurements locally resolved in the direction perpendicular to the flow field channel have provided evidence for inhomogeneous concentration profiles caused by transport limitations (Figure 1).

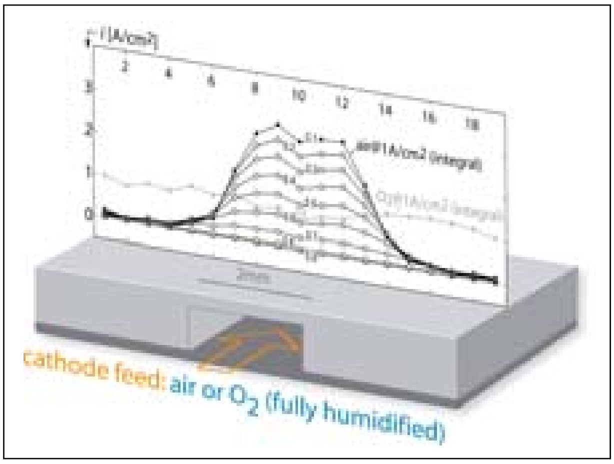


Figure 1: **Direct measurement of local currents under channel and ribs of the flow field plate of a polymer electrolyte fuel cell (PEFC), in two operating modes.**

Energy, environment and society

Particles in the atmosphere adversely affect health and climate, and their attribution to technical and natural sources is of high political relevance. PSI's observation that a large fraction of these particles are secondary – i.e. not formed in exhaust tailpipes but in the atmosphere from volatile organic emissions – requires revision of commonly applied analysis tools and has received very high attention.
The Laboratory for Energy Systems Analysis is engaged in the societal discussion on our country's energy future. In particular, PSI has made important contributions to the Energie Trialog Schweiz by scenario calculations, and has calculated the cost of achieving large CO_2 reductions by 2050 under stringent climate policy targets.

Outlook for 2010

At the beginning of 2010, we welcome two new scientific leaders to the Department: Jeroen van Bokhoven heads the newly formed Laboratory for 'Energy and Environment', operated jointly by the Synchrotron Research and General Energy Departments; and on the retirement of Samuel Stucki, Oliver Kröcher will guide the new orientation of the 'Bioenergy and Catalysis' Laboratory. The CCEM, looking back to a highly successful international audit in 2009, is expected to generate further important results in 2010, based on a powerful research infrastructure and highly motivated research teams.

Producing electricity from wood in high-temperature fuel cells via gasification and hot gas cleaning

Serge Biollaz, Peter Hottinger, Thomas Marti, Marcel Hottiger, Jörg Schneebeli, Urs Rhyner, Marcelo Rechulski, Tilman Schildhauer, *Laboratory for Energy and Material Cycles, PSI*

Linking wood gasification with high-temperature fuel cells, such as Solid Oxide Fuel Cells (SOFC), is a promising approach for achieving high electrical efficiencies in small-scale biomass combined heat and power plants. One of the technical challenges to this is the adjustment of the three main system components: gasification, gas processing/cleaning and fuel cell. An integrated test rig was therefore built at PSI. For the SOFC running on wood gas, a degradation rate of 1% per 1000 hours was determined. Based on this successful demonstration of long-term performance and other results, scale-up to an industrial scale is in preparation.

Combined heat and power (CHP) generation from biomass requires small-scale, distributed plants in the power range of several MW, to be efficient. Therefore, besides gas engines, high-temperature fuel cells such as Solid Oxide or Molten Carbonate Fuel Cells (SOFCs, MCFCs) are also an option for using producer gas from wood gasification for CHP. Gas engines require low gas temperatures at the inlet, thus allowing cold gas cleaning, i.e. particle and tar removal by low-temperature filters and scrubbers. However, it has been shown, when connecting SOFCs to wood gasification, that superior efficien-

Figure 1: **Flexible set-up for long-duration tests of B-IGFC concepts, including gasifier, gas cleaning and high-temperature fuel cells.**

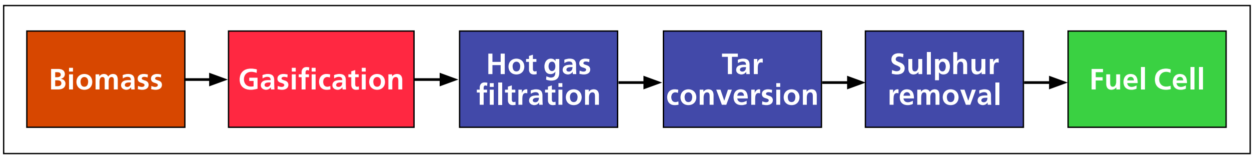


Figure 2: **Process steps for power generation from biomass via gasification, gas cleaning and fuel cells.**

cies can only be reached with high-temperature gas cleaning [1]. Moreover, unlike gas engines, fuel cells require the removal of sulphur species, alkalis and heavy metals.

In ongoing projects with partners such as the Karlsruhe Institute of Technology (KIT), the Thermal Process Engineering Group is investigating hot gas filtration (450 °C) for the removal of particles. The focus here lies on the long-term performance of the filter and on the optimisation of filter cleaning methods to maintain low pressure-drop levels. For the complete removal of sulphur, organic sulphur species have to be converted into hydrogen sulphide (H_2S), first before adsorbing H_2S on, for example, zinc oxide beds at 350 °C. For the upstream conversion of organic sulphur species (unsaturated hydrocarbons and tars), the application of Catalytic Partial Oxidation and Reforming catalysts is being investigated (see Figure 2). In first tests, these catalysts showed good activity for the conversion of hydrocarbons (toluene, anisole) and organic sulphur species (thiophene) in the temperature range foreseen for hot gas cleaning (700 – 800 °C).

The fully automated test rig shown in Figure 1 allows the long-term performance of different unit operations to be studied, as well as the complete process chain to be tested. Several sampling points for online gas analysis have been integrated into the test rig and all relevant gas species, such as permanent gases, tars, sulphur species, alkalis or heavy metals, can be analysed, depending on the specific needs.

Within the framework of the EU project BioCellus, a further set-up has been used to perform a 1200 h test. The interface of wood gasifier and SOFC test setup was a particle filter, through which gas from the gasifier was sucked by a jet pump running on a synthetic wood gas mixture. The interface was designed to yield a tar concentration of 5 g/m^3_n and a total sulphur concentration of 1 mg/m^3_n before feeding the fuel gas to the fuel heating coil upstream of the SOFC stack. For the long-term test, the current density was kept constant and the resulting voltage of the cell recorded. In Figure 3, cell voltage and current density are shown as functions of time on-stream. Cell voltage fluctuates due to changes in gas composition and gas flow, but remains on the same level, within this range of variation.

In this test, it was demonstrated that the cell performed well, with a degradation rate of about 1 % per 1000 hours running, over an accumulated 1200 hours (Figure 3). The conclusion is that tars do not affect cell performance, at least if their concentration is small.

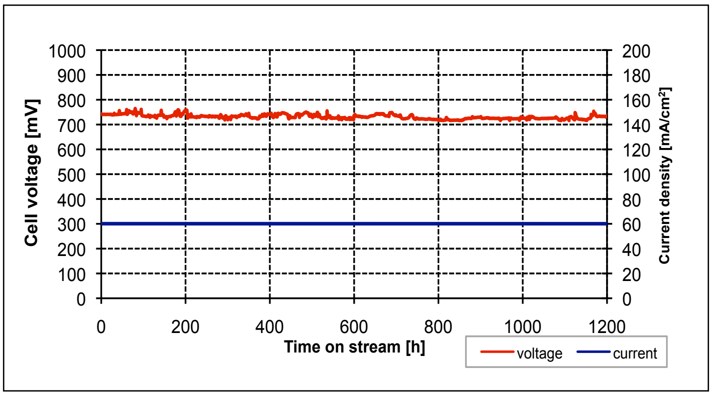


Figure 3: **Results of a long-duration test with a tubular SOFC run with wood gas at PSI [2].**

Outlook

Based on this successful demonstration of long-term performance and further results, scale-up to an industrial scale is in preparation. Within a consortium of industrial and academic partners, the erection of a 1 MW pilot and demonstration unit is planned for the near future. A research programme will support this demonstration activity, covering both experimental optimisation of unit operations and simulation-based analysis of the overall process chain efficiency.

References

[1] F.P. Nagel, T.J. Schildhauer, S. Biollaz, *Biomass integrated gasification fuel cell systems – Part 1: Definition of systems and technical analysis,* Int. J. Hydrogen Energy **34** 6809–6825 (2009).

[2] S. Biollaz, P. Hottinger, C. Pitta, J. Karl, *Results from a 1'200 Hour Test of a Tubular SOFC with Wood Gas,* Proc. 17th European Biomass Conference and Exhibition, Hamburg, Germany (2009).

Production of syngas via solar steam-gasification of carbonaceous feedstocks

Christian Wieckert, *Solar Technology Laboratory, PSI;* Nicolas Piatkowski, *Department of Mechanical and Process Engineering, ETH Zurich;* Aldo Steinfeld, *Department of Mechanical and Process Engineering, ETH Zurich, and Solar Technology Laboratory, PSI;* Albert Obrist, Peter von Zedtwitz, *Holcim Group Support, Holderbank, Switzerland*

Solar-driven gasification allows the upgrading of fossil fuels and carbonaceous wastes to storable high-quality gas. To this end, steam-gasification of coal, biomass, and carbonaceous waste feedstocks for syngas production has been investigated using concentrated solar energy as the source of high-temperature process heat. A 5 kW solar reactor prototype, subjected to radiative flux concentrations up to 3000 suns and operated at temperatures up to 1500 K, yielded high-quality syngas of typical molar ratios $H_2/CO = 1.5$ and $CO_2/CO = 0.2$, and with a calorific content upgraded up to 30% over that of the input feedstock.

Introduction

The concept of solar steam-gasification of carbonaceous materials is schematically shown in Figure 1. Concentrated solar energy provides the high-temperature process heat required to thermochemically convert solid carbonaceous feedstocks (e.g., coal, biomass, or carbon-containing wastes) into high-quality synthesis gas (syngas, mainly H_2 and CO). Syngas can be applied for power generation in efficient combined cycles and fuel cells, or further processed into Fischer-Tropsch liquid fuels or direct combustion, e.g. in cement kilns.
Conventional autothermal gasification requires about one third of the introduced feedstock to be combusted with pure O_2 to supply the process heat for the endothermic gasification reaction, which inherently decreases coal utilization and contaminates the product gases. In contrast, syngas from solar-driven steam gasification is free of combustion by-products and has a lower CO_2 intensity, because its calorific value is solar-upgraded over that of the original coal feedstock by an amount equal to the enthalpy change of the reaction. Solar thermochemical gasification is ultimately a means of chemically storing intermittent solar energy in a dispatchable form.

Experimental setup

The solar reactor configuration (see Figure 2) is specifically designed for beam-down incident concentrated solar radiation. It consists of two cavities separated by a SiC-coated graphite plate. The upper cavity serves as the radiative absorber and the lower one as the reaction chamber containing the reacting packed-bed that shrinks as the reaction progresses. Steam is injected through the bottom. This arrangement enables the reactor to receive a wide range of particles sizes.

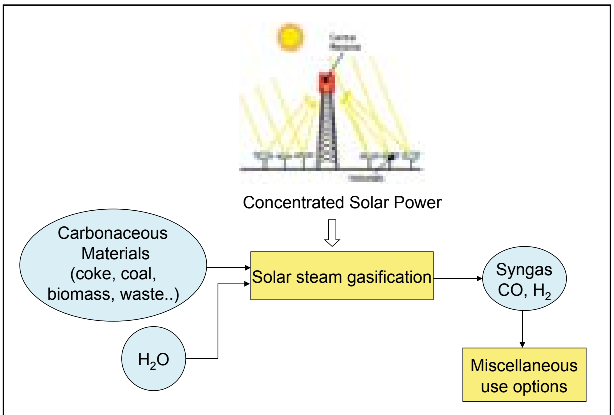


Figure 1: **Scheme of solar steam gasification.**

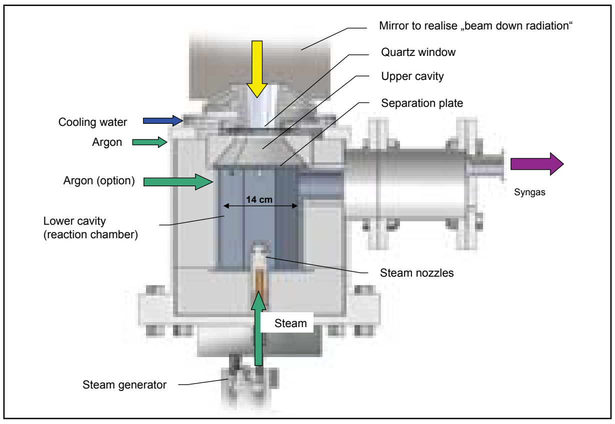


Figure 2: **Scheme of the solar reactor configuration.**

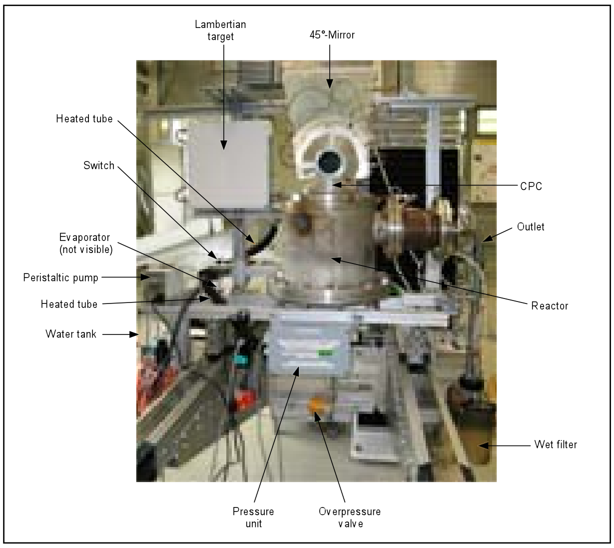


Figure 3: **Photo of the 5 kW laboratory-scale solar gasification plant.**

A 5 kW prototype reactor was fabricated with a 6.5 cm-dia. windowed aperture and a 14 cm-dia. cylindrical lower cavity of 2 kg feedstock capacity. Experimentation was carried out at PSI's High-Flux Solar Simulator [1], where the reactor was subjected to radiative flux concentrations of up to 3000 suns. Typical operational temperature of the bed surface was in the range of 1150–1250 °C. Figure 3 provides a photo of the experimental set-up that includes the solar reactor, downstream gas treatment system, measurement instrumentation, and auxiliary equipment.

A typical test: Steam gasification of fluff

The carbonaceous feedstocks tested were industrial and sewage sludge, scrap tyre powder, fluff, South African coal, and beech charcoal, and are characterized by having a wide range of volatile, ash, and fixed carbon contents, elemental compositions, and physical properties [2]. A representative experimental run is described with fluff: a highly heterogeneous waste consisting of synthetic textiles, paper, and shredded plastics, with a carbon content of about 50wt-%, an ash content of 15%, and an LHV of about 25000 kJ/kg. The lower cavity was loaded with 378 g of fluff, resulting in a 10 cm-high packed-bed.
The experimentally measured temperatures and gaseous product mass flow rate during the solar steam-gasification of fluff are shown in Figure 4. During the first half of the test, as the packed-bed undergoes heating, pyrolysis was evident through the evolution of higher gaseous hydrocarbons and liquid tars. Afterwards, steam gasification of the remaining fixed carbon took place, producing syngas of molar ratios H_2/CO = 1.5 and CO_2/CO = 0.2. The carbon content of the residual ash after the test (55 g) was only 0.3%.

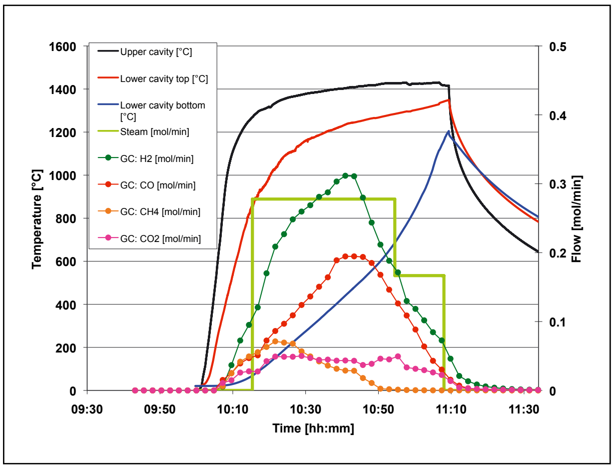


Figure 4: **Experimentally measured temperatures and gaseous product mass flow rate during the solar steam-gasification of fluff.**

The average shrinking rate of the packed-bed was 7 cm/h. Heat transfer was characterized by an ablation regime, where the rate of radiative transfer to the endothermic reacting top-surface was faster than the conductive heat transfer to the depth of the packed bed [3]. Peak energy conversion efficiency of 29% and upgrade factor of 30% demonstrated the successful conversion and storage of solar energy in chemical form.

Conclusions

The steam-gasification of coal, biomass, and carbonaceous waste materials has been experimentally demonstrated using a robust packed-bed 5 kW solar reactor subjected to concentrated radiative energy. High-quality syngas with a solar-upgraded calorific value could be successfully produced from a variety of feedstocks, with very different characteristics in terms of content of volatiles, ash, and water [2]. Current development work is aimed at reactor design optimisation and scale-up for a 300 kW pilot plant.

References

[1] J. Petrasch, P. Coray, A. Meier, M. Brack, P. Haeberling, D. Wuillemin, A. Steinfeld, *A 50-kW 11,000-suns novel high-flux solar simulator based on an array of Xenon arc lamps,* Journal of Solar Energy Engineering **129** 405-411 (2007).

[2] N. Piatkowski, C. Wieckert, A. Steinfeld, *Experimental investigation of a packed-bed solar reactor for the steam-gasification of carbonaceous feedstocks,* Fuel Processing Technology **90** 360-366 (2009).

[3] N. Piatkowski, A. Steinfeld, *Solar-driven coal gasification in a thermally irradiated packed-bed reactor,* Energy & Fuels **22** 2043-2052 (2008).

Combustion of hydrogen-rich fuels

I. Mantzaras, Y. Ghermay, S. Daniele, P. Jansohn, *Combustion Research Laboratory, PSI*

The need to reduce CO_2 emissions from large power plants has led to the development of fuel decarbonisation technologies that yield hydrogen-rich reformed fuels. Homogeneous (gas phase) combustion as well as combined homogeneous/heterogeneous (catalytic) combustion is currently being investigated for power generation systems fuelled with these H_2-rich mixtures.

Operational window

Despite growing interest in highly reactive, hydrogen containing fuels (e.g. syngas) for gas turbine (GT) combustion systems, arising from the integration of power generation with gasification processes for the utilization of biomass, coal or tars, a lack of data still exists for lean premixed combustion experiments at gas-turbine-relevant conditions. More specifically, there is very little high-pressure data (> 10 bar) for turbulent, lean premixed flames available. Changes in flame characteristics at elevated pressure (operational window, flame position, flame structure, turbulent flame speed) necessitate such experiments.
As for the ultra-lean side, operational limits are defined by lean blow-out (LBO); on the richer side, the limiting phenomenon is flashback (FB). For the burner geometry studied, the mechanism for flashback is thought to be through the upstream propagation of the flame front in the boundary layer of the mixing section.

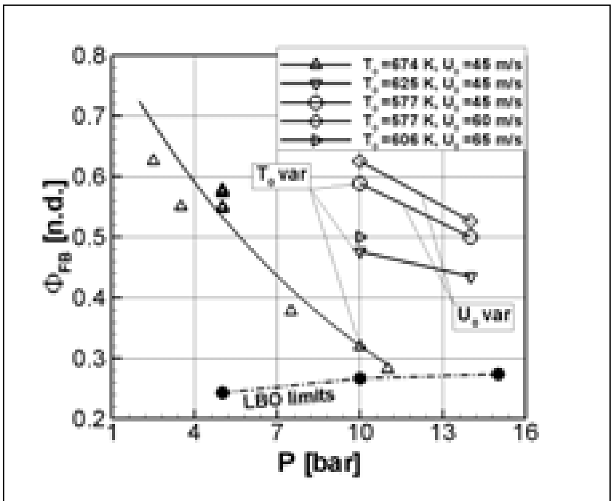


Figure 1: **Operational window for a fuel mixture of 50% H_2/50% CO.**

Much stronger than observed for the LBO limits, the FB behaviour presented in Figure 1 exhibits a dependence on pressure, narrowing the operational range dramatically for elevated pressure conditions (> 10 bar). An increase in pressure affects several variables, such as chemical kinetics (reduced laminar flame speed), turbulent length scales and ignition phenomena (reduced ignition delay time and smaller quenching distance). Not surprisingly, flashback propensity was also found to be very sensitive to the inlet temperature (Figure 1). The operational window expands significantly with respect to flashback as the preheating temperature decreases.

Turbulent flame speed

One of the most important parameters to take into account for safe gas turbine combustion of hydrogen-rich fuel gases is the turbulent burning velocity (S_T), which describes the overall fuel consumption rate across the entire flame front surface. The focus of our work [1] has been on such turbulent flame speed (S_T) data, analyzed from experiments which provide information about the flame surface area based on laser-induced fluorescence (OH LIF) pictures of the flame front. As expected, the results highlight the strongly elevated values of turbulent flame speed for high hydrogen-containing fuel gas mixtures (e.g. syngas). Compared with flame speed data for pure CH_4, the ratio $S_{T,Syn}/S_{T,CH4}$ has values between 3 and 10. In absolute terms, values can go up to 8 m/s, indicating a high risk for potentially disastrous flame flashback. For ultra-lean conditions, high burning velocities can be maintained with increased H_2 content in the fuel mixture, thus avoiding undesired flame extinction (Lean Blow Out). Experiments were done at gas-turbine-relevant conditions, i.e. for air preheating temperature up to 772 K, pressure up to 15 bar and different burner flow velocities (40 – 120 m/s).

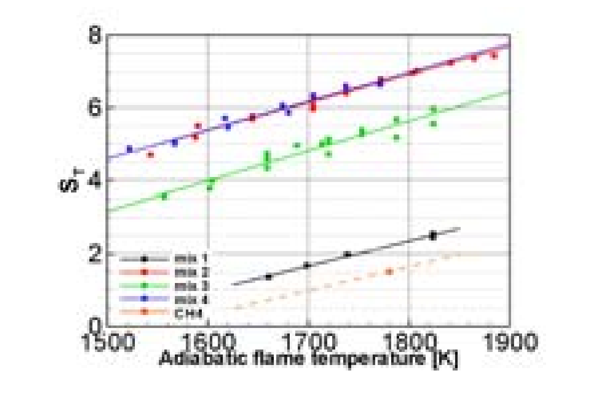


Figure 2: **Turbulent burning velocity for hydrogen-rich fuel mixtures. Conditions: P=5bar, T_{air}=673 K.**
Fuel mixture composition: #1 (H_2-CO-CH_4 20-20-60); #2 (H_2-CO 50-50); #3 (H_2-CO 33-67); #4 (H_2-CO-N_2 40-40-20).

Homogeneous / heterogeneous (catalytic) combustion

The gas-phase ignition kinetics of hydrogen are an intricate function of pressure and temperature, but have not been explored in detail at preheat and pressure conditions of interest for gas turbine systems. There is also a lack of corresponding high-pressure heterogeneous/homogeneous combustion studies. The presence of the catalytic pathway complicates the understanding of gas-phase kinetics due to heterogeneous/homogeneous chemical and thermal coupling. In the present work [2], previous studies are being expanded in two directions by investigating preheated H_2/air mixtures (up to 650 K) at pressures of up to 15 bar, and by investigating the effect of fractional hydrogen pre-conversion on the subsequent homogeneous ignition characteristics over Pt.

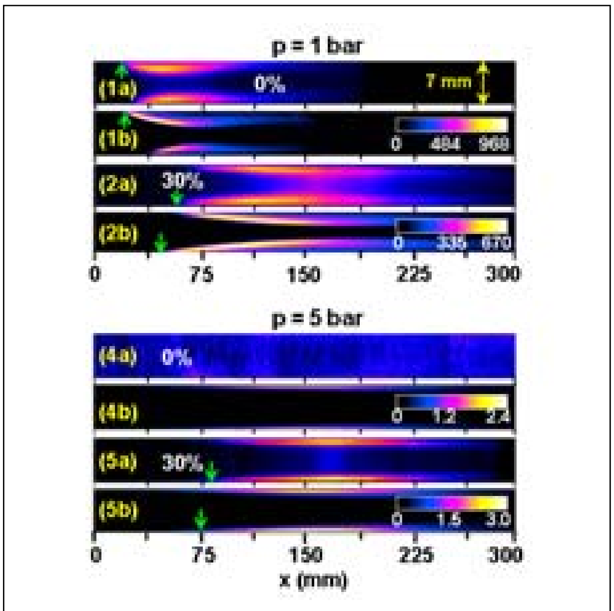


Figure 3: **Distributions of the OH radical: measured by LIF (a), and numerically predicted (b). φ = 0.30, H_2/air, Pt coating. Cases (1) and (3): no hydrogen pre-conversion; (2) and (4): 30% H_2 pre-conversion. Arrows indicate onset of homogeneous ignition. Colour code: OH level in ppmv.**

Pre-conversion results in reduced fuel concentration and increased temperatures for the ensuing reactive mixture and in addition provides main combustion products and radicals in the gaseous induction zone. These factors can significantly influence the heterogeneous/homogeneous chemistry coupling that leads to the onset of homogeneous ignition. Fractional fuel pre-conversion can be of general industrial interest for sequential combustion gas turbines systems, solid-oxide fuel cells and autothermal chemical reactors (ATR).

For 0% pre-conversion and catalyst surface temperatures in the range 900 K ≤ T ≤ 1100 K, homogeneous ignition was largely suppressed for p ≥ 5 bar, due to the combined effects of intrinsic gas phase hydrogen kinetics and competition between the catalytic and gas phase pathways for fuel consumption. However, a moderate increase of hydrogen pre-conversion to 30%, with the ensuing preheat of the reactive mixture, restored homogeneous combustion for p ≥ 5 bar (Figure 3; case 5).

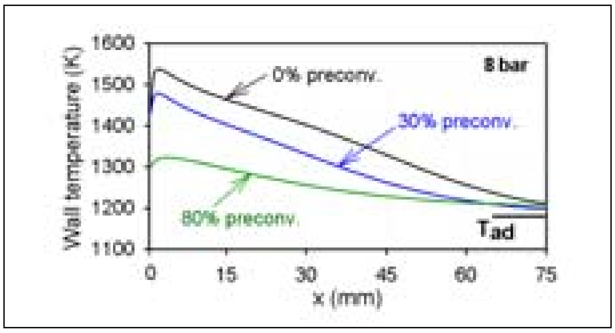


Figure 4: **Computed wall temperature profiles in a catalytic honeycomb reactor. Pt coating, p = 8 bar. φ = 0.30, H_2/air, three different pre-conversion ratios. adiabatic equilibrium temperature T_{ad} = 1181 K (for all cases).**

For 0% hydrogen pre-conversion, catalytic reactors exhibit superadiabatic surface temperatures that endanger reactor and catalyst integrity. By increasing hydrogen pre-conversion, the catalytically induced superadiabaticity is suppressed to a great extent, due to the reduction of available hydrogen for subsequent heterogeneous conversion (Figure 4). The near-wall gaseous combustion zone shields the catalyst surface from the hydrogen-rich core flow, thus reducing catalytic fuel conversion, which is responsible for the surface temperature superadiabaticity.

References

[1] S. Daniele, P. Jansohn, K. Boulouchos, ASME Turbo Expo, GT2009-59477 (2009).

[2] J. Mantzaras, R. Bombach, R. Schaeren, Proc. Combust. Inst. **32** 1937–1945 (2009).

Carbon – a unique material for electrochemical applications

Rüdiger Kötz, Patrick Ruch, Petr Novák, Wolfgang Märkle, Jean-François Collin, Hendrik Schulenburg, Bernhard Schwanitz, Nicolas Linse, Lorenz Gubler, Günther G. Scherer, Alexander Wokaun, *Electrochemistry Laboratory, General Energy Research Department, PSI*

Carbon in a variety of forms plays an important role in almost any electrochemical energy conversion and energy storage device. In supercapacitors and lithium-ion batteries, nanoporous carbon and graphite serve as the active electrode material as well as conductivity promoter. In low-temperature polymer electrolyte fuel cells, carbon is used as catalyst support, for the gas diffusion layer and also for some types of bipolar plates. In the present article, several recent research results are presented, from investigations aimed at improving energy and power density and the life-times of electrochemical devices.

Carbon modifications of interest for electrochemical applications

Carbon appears in different forms, e.g. graphite, diamond, nanotubes and fullerenes, or amorphous carbon, due to the versatility of carbon atoms in establishing bonds of different hybridization between one another. Based on particularly favourable physico-chemical properties, such as crystalline structure, density or conductivity, these different forms find widespread applications as electrodes, support, structure, etc.

Carbon nanotubes in supercapacitors

Carbon nanotubes (CNT), in particular single-walled carbon nanotubes (SWCNTs), are a promising electrode material for electrochemical double-layer capacitors (EDLC), due to their high specific surface area (Figure 1).

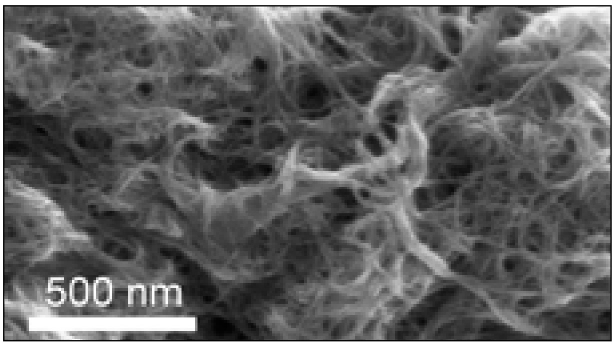


Figure 1: **Scanning electron micrographs of a filtrated SWCNT material. The observed structures are bundles of several nanotubes. The diameter of a single nanotube is 1 – 2 nm.**

In a recent study, we showed that the specific capacitance of SWCNTs is comparable with that of activated carbon. However, the resistance of an electrode prepared from SWCNTs is significantly reduced and the surface of SWCNTs is expected to show low reactivity towards degradation processes. SWCNTs thus have the potential to improve the power of EDLCs, while maintaining the energy density [1].

Graphite as conductivity promoter in Li-batteries

Apart from its use as electroactive material in negative electrodes, graphitic carbon is used in lithium-ion batteries as a conductive additive in positive electrodes, to secure good electrical conductivity, providing conductive paths between the low-conducting oxidic active materials. However, anions, inherently present in the electrolyte, might intercalate between the graphene sheets of the particles, due to the high positive voltage applied to the electrode during charging of the cell. This may lead to irreversible exfoliation of graphene layers, whereby the whole particle is expanded and the electrode structure deteriorates [2].

Synchrotron-based *in situ* X-ray diffraction measurements have demonstrated that graphites with small particles are beneficial as conductive additives because they show only a weak anion intercalation tendency. However, larger particles undergo reversible anion intercalation, indicated by the occurrence and disappearance of new diffraction peaks (Figure 2), and also partial amorphisation (exfoliation) of the graphite structure, as can be observed from the decrease of the graphite (002) peak intensity.

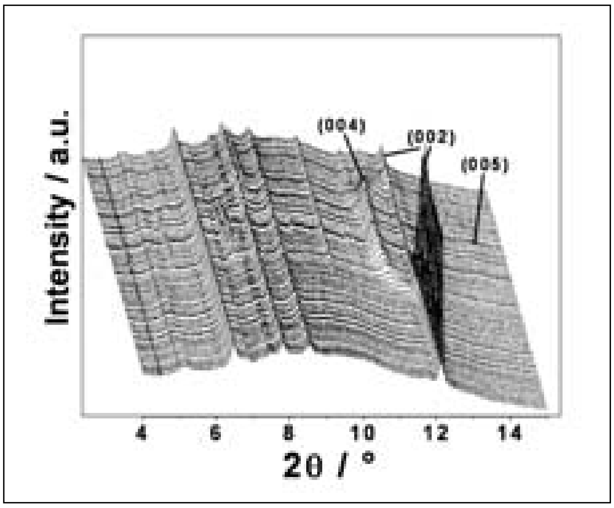


Figure 2: **Synchrotron-based X-ray diffractograms (from bottom to top) recorded during a CV (3.0 – 5.2 V vs. Li/Li+) of SFG44 in EC:DMC 1:1, 1 M $LiPF_6$.**

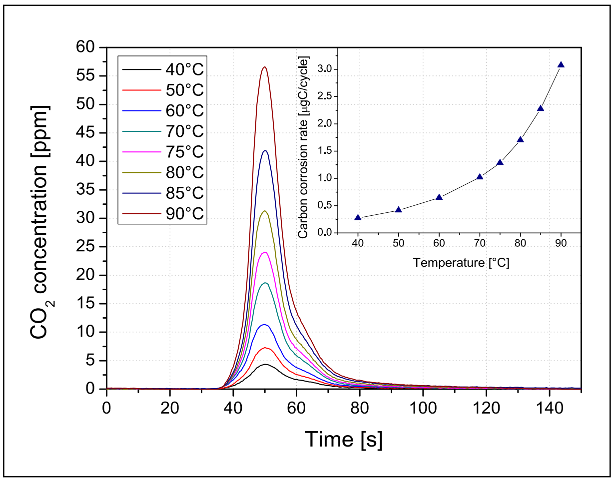


Figure 3: **Cathode exhaust gas CO_2 concentration as response to a triangular potential pulse between 0.6 and 1.3 V for different cell temperatures (fully humidified gases). The inset shows the resulting carbon corrosion rates, which are obtained by integration of the CO_2 peak areas.**

Stability and morphology of carbon black as catalyst support in fuel cells

Nano-sized platinum particles supported on carbon black are used as electrocatalyst for hydrogen oxidation and oxygen reduction in low-temperature fuel cells. Carbon black possesses unique structural and electrical properties for its use as catalyst support in Polymer Electrolyte Fuel Cells (PEFCs). The carbon support prevents sintering of platinum nanoparticles, which catalyse the oxygen reduction and hydrogen oxidation reactions in PEFCs. The high surface area carbon support, which is stable under normal fuel cell operating conditions, can severely deteriorate at the elevated potentials

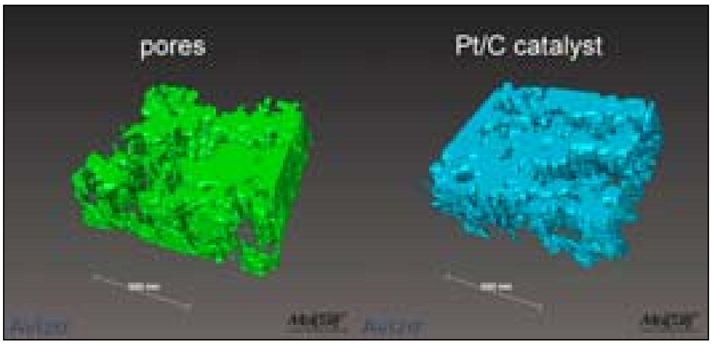


Figure 4: **3D images of a PEFC active layer – pore structure (left) and carbon supported catalyst (right). Images were segmented and reconstructed from SEM images, obtained during FIB/SEM serial sectioning of a commercial PEFC cathode.**

(>1.2 V) occurring during start-up and shut-down of the fuel cell, leading to substantial loss in performance [3].

In order to develop operation strategies which can mitigate this detrimental effect, an understanding of how operating parameters influence carbon corrosion is necessary. Measuring the CO_2 concentration in the cathode exhaust gas in response to single potential pulses allows the quantification of carbon corrosion rates (Figure 3). By performing these measurements under various operating conditions, the complex interplay of influencing parameters can be elucidated [3].

As a consequence of this carbon corrosion process, morphological changes occur within the catalyst layer. Among other effects, porosity changes affect the mass transport of the gaseous reactants and the interfacial properties between electron- and ion-conducting phases. Ultimately, these changes lead to degradation of fuel cell performance.

The combination of focused ion beam (FIB), as preparative method, and scanning electron microscope (SEM), as imaging technique, introduces new possibilities for visualizing and quantifying morphological changes of the PEFC active layer (Figure 4) [4]. As a characterization tool, it offers new insights to aid in understanding carbon corrosion and developing alternatives in the context of PEFC electrode design.

References

[1] P.W. Ruch, R. Kötz, A. Wokaun, Electrochim. Acta **54** 4451–4458 (2009).

[2] W. Märkle, N. Tran, D. Goers, M.E. Spahr, P. Novák, Carbon **47** 2727–2732 (2009).

[3] N. Linse, C. Aellig, A. Wokaun, G.G. Scherer, L. Gubler, ECS Transactions **25** 1849–1859 (2009).

[4] H. Schulenburg, B. Schwanitz, J. Krbanjevic, R. Mokso, A. Wokaun, G.G. Scherer, PSI Electrochemistry Laboratory Annual Report 2009, ISSN 1661-5379 (2010).

Competence Center Energy and Mobility CCEM
A network to foster interdisciplinary research approaches

Philipp Dietrich, Alexander Wokaun, *Competence Center Energy and Mobility CCEM, Switzerland*

After four years of operation, the Competence Center for Energy and Mobility (CCEM) has proven its role as bridge-building institution between fundamental research and industrial development requirements, in the field of energy research, and now is well integrated into the organizational structure of PSI. Within many projects, both energy research departments at PSI are collaborating with a variety of groups from all institutions of the ETH domain. As examples, in the present article, results from projects are mentioned that target different steps in the chain from biomass hydrothermal processing, via efficient gas turbine combustion, to atmospheric emissions. With a total funding of MCHF 5 by the ETH Board, CCEM was able to attract MCHF 4.0 of public, and MCHF 6.6 of private, third-party funding. Supplementing its portfolio, a first thematic call for proposals was launched, targeting the electrification of individual transportation.

The crucial relevance of energy as a research area is underlined by increasing world-wide efforts to boost innovation and competitiveness, and to secure access to affordable and clean energy. CCEM strives to accelerate research activities in the fields of energy supply, conversion, transmission and use. Among other measures, CCEM further consolidated three major approaches in 2009 for achieving these goals:

- a transparent and proven process for facilitating interdisciplinary projects, emphasizing high standards of scientific quality,
- concentrated research effort on dedicated questions in the field of energy,
- access to cutting-edge infrastructure for energy research within the ETH domain, and continuous upgrading of this infrastructure for facilitating projects.

In their evaluation report of 2 February 2009, the Evaluation Committee concluded that CCEM is a model of outstanding success, in an excellent position to generate impact, on the right track, and ready to expand its programme and activities beyond its current portfolio. The financial resource allocation was considered to be very effective and the projects' duration and progress adequate. For the further advancement of the Center, the Evaluation Committee recommended that:

- CCEM be strongly supported in the future,
- quality control be optimized,
- the most relevant subjects should be actively sought out, concentrating know-how and setting priorities according to the Center's strategy,
- further efforts should be made to vitalize contact with research partners from industry, legislative bodies and socio-economic fields.

CCEM published two calls for research proposals in 2009: a joint call in May, together with Swisselectric Research, on the topic of "Pathways Towards the Electrification of Individual Transportation"; and a second, general, call in October. In total, 15 new proposals have been submitted, of which 4 have so far been approved, with the evaluation process still going on. These proposals involve 74 research groups from PSI, ETHZ, EPFL, EMPA and the Swiss Center for Electronics and Microtechnology CSEM, and include 13 groups from several universities of applied science.

Results of collaborative projects

Several projects have reached important milestones. As examples, we present projects that focus on converting renewable resources into energy carriers, on using them efficiently, and on minimizing their environmental impact.

In the *"2nd generation biogas"* project, continuous operation of the hydrothermal conversion of liquid biomass into synthetic natural gas (SNG) has been achieved for the first time, with the experimental results verifying process simulation. Investigation of the potential of biomass available for energy revealed large unused stocks in forests and residual wood, manure and waste wood. Only half the potential available is being used today (Figure 1).

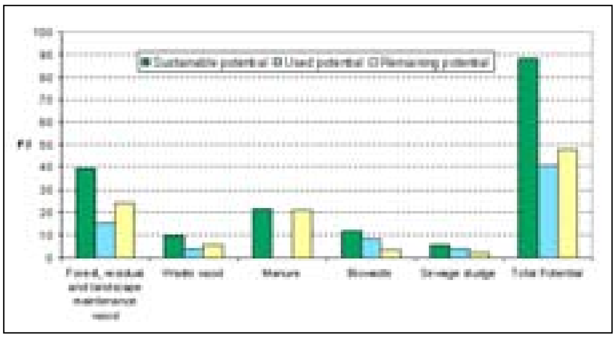


Figure 1: **Assessment of the potential energetic use of biomass in Switzerland.**

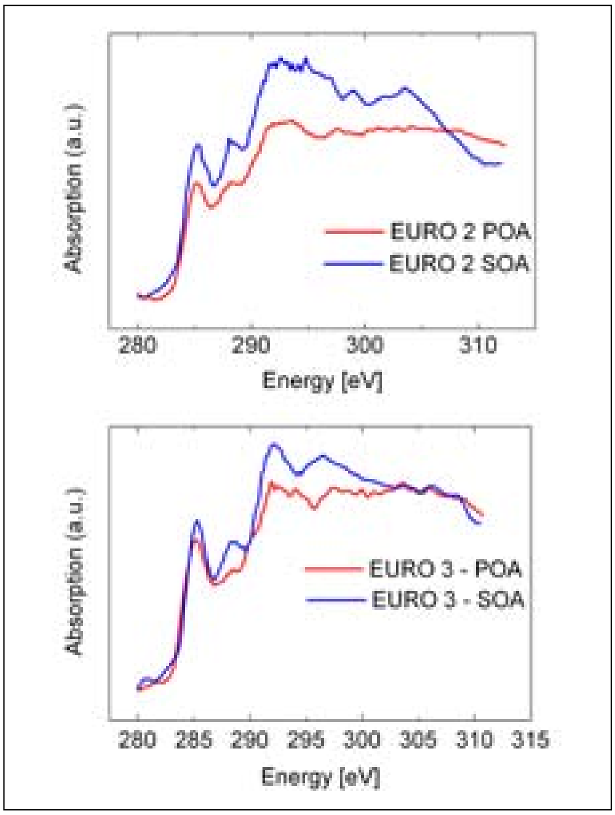


Figure 2: **Carbon K-edge NEXAFS spectra of individual soot particles in samples taken immediately after injection into a smog chamber (POA, red) and after processing by simulated sunlight (SOA, blue). Results are compared for a Euro-2 (top) and a Euro-3 (bottom) diesel vehicle. The main features of interest are peaks at 285 eV (aromatic hydrocarbon species), 288 eV (carboxylic functional groups) and 292 eV (aliphatic hydrocarbons).**

In the project *"Technologies for Gas Turbine Power Generation with CO_2 Mitigation, GT-CO_2"*, the structure of a gas-turbine process using flue gas recirculation (FGR) is being investigated, with the aim of increasing the CO_2 fraction of the exhaust gas and thereby reducing the volume to be treated in a CO_2-capture plant. Thermo-economic modelling for two configurations has been performed. Combustion studies showed lower flame stability with increased FGR, whereas modelling revealed the potential for increasing efficiency and power output with increased FGR rate. Catalytic and non-catalytic combustion experiments have been performed to create a consistent data set of flame regimes, making it possible to simulate combustion with air or high rates of FGR with detailed gas-phase mechanisms.

In the project *Next Generation Exhaust Aftertreatment (NEADS)*, new selective catalytic reduction (SCR) catalyst materials are being investigated in order to achieve high reactivity and conversion, even at low exhaust gas temperatures. In addition, a ceramic-foam-based substrate is under development to replace the conventional diesel oxidation catalyst, thereby improving the performance and lifetime of the subsequent after-treatment system (particulate filter and/or SCR system). For iron-exchanged zeolites being investigated as SCR catalysts, a calculation method was developed to estimate the fractions of different iron species and to assess their mechanistic role in the SCR reaction.

To understand the influence of new ceramic-foam-based catalysts on the diesel particulate filter (DPF) installed downstream, the deposition of soot and ash in the DPF has been analyzed and is now understood in more detail.

Another aspect of the project is to understand the morphology of soot particulates processed in the smog-chamber. Analysis has shown a clear correlation between after-treatment technology (as required to fulfil Euro norms) and the chemical functional group composition (Figure 2).

The results and activities of the other projects, in the fields of mobility, electricity, heat and buildings, as well as fuels from renewable primary energy sources, can be found in [1].

Interaction with society

As of 1 January 2009, CCEM joined forces with novatlantis, the sustainability initiative of the ETH Domain, and its outreach activities, which have further enhanced the position of CCEM as a cross-institutional activity.

In April, CCEM presented new technologies for powertrains for transport vehicles at the "Westfest", the inauguration of a new stretch of the Autobahn around Zurich.

In October, the "Energie-Trialog-Schweiz" (ETS) published its "Energie-Strategie 2050", a road map for the future Swiss energy system, encompassing supply and demand. The ETS initiative aims at promoting understanding between society/politics, industry, and science. In the years 2007–2009, CCEM provided numerous studies and inputs into the ETS process, to base the formulation of this energy strategy on sound scientific results and energy-economic modelling [2].

References

[1] CCEM Annual Activity Report 2009 (www.ccem.ch)
[2] www.energietrialog.ch

Nuclear energy research and its complete toolbox

Jean-Marc Cavedon, *Nuclear Energy and Safety Research Department, PSI*

The wish to understand nuclear energy production systems "from the atom to the reactor" comes every year a little closer to an operational reality. This calls for a wide array of different levels of research and research tools. We will use this year's selection of scientific highlights from the Nuclear Energy and Safety Department to illustrate the variety of tools that belong the nuclear energy researchers' toolbox, from ab-initio description of materials to fluid mechanics and planet-scale energy models.

Nuclear energy originates by nature from subatomic events, i.e. nuclear fissions, which deliver energy to complex engineered power units up to and above the gigawatt level. This inherent duality between the microscopic and the macroscopic worlds shapes the research areas in nuclear energy and also defines the numerous complementary experimental, instrumental and numerical tools it needs. We will use the selection of our research topics from 2009 to guide us through the experimental and computational tools that our Department uses to obtain and publish its state-of-the-art research results.

Experiment, theory and simulation

Our first example introduces us to numerical simulation, which the exponential rise in computing power is bringing to a par with the traditional experimental approach. M. Krack reports on the computer-simulated "heating" of a UO_2 crystal up to 1500 K, solidly founded on basic theory (here quantum physics); one could describe this work as an "in silico" experiment on a (virtually) radioactive sample. This neologism makes even more sense if one assigns the term "in vitro" to experiments where all parameters are well controlled, while "in vivo" would describe full-scale experiments in which the complexities of a complete engineered system (for reactors) or of the natural environment (for geological repositories) are preserved

High-performance computing

The next illustration of recent developments, requiring hundreds of thousands of CPU-hours per year, no longer concerns a model of a nuclear ceramic such as UO_2, but a model of structural materials in nuclear conditions – here, the Fe-Cr-C system as a simplified model for steels, and ultimately high-temperature steels such as the ODS (oxide dispersoid strengthened) family. A.C. Uldry et al. show that calculations based on Density Functional Theory already bring an insight into how Cr atoms are clustered (or conversely soluted) in an Fe matrix, according to the Cr content. Here, magnetism is pointed at as the microscopic origin of emerging properties such as atom clustering.

High-accuracy and high-resolution measurements

An interdisciplinary team at PSI has been involved in a new measurement of the half-life, $t_{1/2}$, of ^{60}Fe (I. Günther et al.). Separation chemists, analytical chemists, radiation physicists and astrophysicists have determined the value of $t_{1/2}$ by setting a known number of ^{60}Fe isotopes in a low radiation background environment and measuring the absolute number of gamma rays emitted by their daughter ^{60}Co isotopes. The accuracy of the measurement was improved by a factor of 12 over the previous one. This remarkable step forward in accuracy also brought a value for $t_{1/2}$ which is surprisingly higher than previously determined (+75%). This forces astrophysicists, e.g. modellers of the Solar System, to revise present models. Also noteworthy is the fact that the large collection of several 10^{15} isotopes of ^{60}Fe was created by transmutation reactions during the activation of a copper block beam dump by the very high current of high-energy protons available at PSI. Nuclear waste gives here direct information on our Solar System and on our Universe.

Safe underground storage is also a topic that benefits from high-resolution measurements. D. Popov et al. show that crystallography with present-day high-brilliance X-ray beams can bring us a precise identification of the structure and composition of micrometre-size crystals in a highly heterogeneous environment. To help understand how the cements that we use today for packaging radioactive waste will look like in 100,000 years, the team of geochemists have studied 100,000-year-old natural cements and identified in them, for instance, tiny tobermorite crystals. The micrometric spatial resolution of the microXAS beam line SLS was crucial in extracting a clear signal within a very heterogeneous sample.

Full-scale and small-scale facilities

Studies on the safety of nuclear reactors today do not rely solely on atomic-size calculations, and this by a long way. Large-scale phenomena are essential in describing real-life configurations. This year's example is given by D. Paladino et al., who studied the mix of hydrogen, steam and air that could be found in a nuclear reactor containment vessel after a hypothetical core meltdown. Gas stratification could lead to the formation of hydrogen-rich layers, with the risk of hydrogen detonation/deflagration. The numerous mass and heat sources and sinks brought by the operation of several safety devices tend to destroy these layers by turbulent mixing. The dynamic interplay between build-up and destruction of the layers will in the end either give rise to a hydrogen risk, or not. Nothing less than full-height experiments (tens of metres) on heavily instrumented gas mixing vessels such as PANDA at PSI can deliver the basic data needed for evaluating and mitigating the risk of such rare gas mix configurations. These data are also essential for calibrating today's complex computational fluid dynamics calculations, including three-dimensional effects.
On the other hand, nothing less than small-scale experiments on separate effects with specially developed instruments will allow further improvement of these computer codes, as well as the thorough training of our students.

Nuclear energy as an element of the sustainable energy mix

Reliable and safe operation of nuclear plants, together with safe and credible disposal of nuclear waste, are essential for the social acceptance of this particular energy source. A clean ecological record and economic competitiveness are the two other properties needed to make nuclear energy a sustainable one. Planet-scale energy scenarios, like the ones devised by H. Turton et al., help us in understanding the position and trends of the share of nuclear energy in the sustainable energy mix. The results extracted from the ADAM project, co-funded by the EU Commission, stress here what stringent CO_2 atmospheric concentration targets would imply in terms of technology development to meet these targets, and at what cost.
The targets range from none (business as usual) to a very stringent 400 ppm at the end of the century, barely higher than today's 380 ppm.
Focusing on the nuclear share of the supply mix, it appears that in all scenarios the nuclear fleet will at least double by 2050 and then decrease almost to the present level, if uranium resources are consumed with today's technology (light water reactors). When one assumes a more resource-sparing reactor technology (fast breeder reactors), the nuclear share soars to 30% of the world electricity supply while slashing the cost of CO_2 mitigation measures by a few percent in terms of world GDP. This expansion would be carried out at the expense of the fossil and biomass shares, both supposedly equipped with costly carbon capture and sequestration units. Other renewable sources are assumed by then to have achieved economic competitiveness and keep their share in this sensitivity study. The study also considers social rejection of the nuclear solution (phase-out) and its (high) attached cost.

Conclusion

Computers, samples of nuclear waste or geological cements, detectors, mass spectrometers, X-ray beams, full-size instrumented vessels, together with a global and accurate description of all technology sources, this is the list of tools used to obtain the results shown in the following pages. It captures the variety of tools and disciplines that belong to the nuclear energy researchers' toolbox. There are, of course, many more tools that are used and many more results to show, which we will present in the years to come.

Approaching uranium dioxide from first principles

Matthias Krack, *Laboratory for Reactor Physics and Systems Behaviour, PSI*

Simulation has matured to a third pillar of equal importance in research next to its two classical pillars, experiment and theory. Accurate and reliable simulation methods, based on first principles of physics, are now available to simulate chemical reactions using up-to-date supercomputers, introducing a new era in materials research. One can now simulate nuclear fuels, such as uranium dioxide, thereby reducing the need for difficult and costly experiments with hazardous materials. Properties obtained from atomistic simulations can be used as input parameters for macroscopic fuel performance codes employed for safety evaluations.

In recent decades, simulation has become the third fundamental component in research, in addition to experiment and theory. Fundamental research, especially, is nowadays driven by the powerful interplay of these three basic ingredients (Figure 1).

Many problems are today addressed using simulation techniques, due to the rapid growth of computing power. The development of accurate and reliable simulation methods has opened the door to a new quality of research in biology, chemistry, and materials research. For instance, chemical reactions are now performed in the computer ("in silico" biology) using first-principles simulation methods. In this way, computers have become virtual laboratories, and consequently supercomputers are a new kind of high-performance research facility, like the various experimental research facilities at PSI.

First-principles methods

First-principles methods are directly derived from established laws, the so-called first principles, of physics. Thus they involve no ad-hoc assumptions and no fitting parameters. The predictive power of first-principles methods originates from the accurate description of the underlying physics. Such methods are also called ab-initio methods. Prominent examples of ab-initio methods are electronic structure methods which solve the Schrödinger equation to obtain the wave function of a system. Once this wave function is known, then, in principle, all kinds of properties can be derived from it. However, the solution of the Schrödinger equation is a difficult task, since electrons behave as non-classical particles and exhibit a complicated correlated motion together with the nuclei. A straightforward brute-force solution is already computationally too demanding for systems with only a few atoms. Controlled approximations, which can physically be justified, are required. For instance, an important approximation which is commonly applied is the adiabatic separation of the motion of nuclei and electrons, known as the Born-Oppenheimer approximation. This separation is physically justified by the large mass difference between nuclei and electrons. However, the correlated motion of the electron alone still remains a challenging problem and many advanced techniques are necessary for its solution. Nowadays, density functional theory (DFT) is a very popular and efficient approach to tackle this problem. Hohenberg and Kohn showed, in their seminal work in 1964, that there is a one-to-one correspondence between the electron density and the energy of a system. The advantage of dealing with the electron density instead of the wave function becomes immediately obvious if one notes that the wave function of an N-electron system depends on 3N coordinates, or even 4N if the spin is included. In contrast, the electron density is given by the square of the wave function, integrated over N-1 electron coordinates, that depends on just 3 spatial coordinates, independent of the number of electrons. Thus, the electron density has the same number of variables, independent of the system size, while the complexity of the wave function increases tremendously with the number of

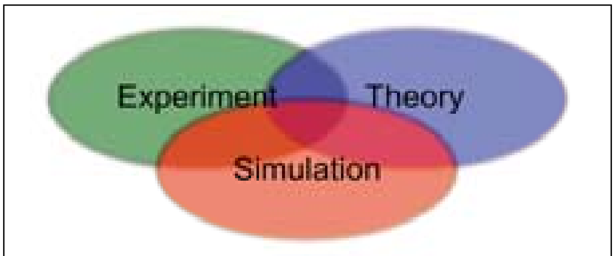


Figure 1: **Interplay of major research ingredients.**

electrons. In the framework of DFT, electron interactions are described by a functional which provides direct mapping between electron density and energy. Unfortunately, the exact functional is not known, but functionals derived from the physical properties of the electron gas have been devised. The results obtained with these functionals are surprisingly accurate and reliable, even if it would not be intuitively expected that the electrons in a crystal or a molecule bear any resemblance to an electron gas. Consequently, strongly correlated electrons, such as the *d*-electrons of the first-row transition metals or the *f*-electrons of the lanthanide and actinide elements, are challenging for DFT methods and need special treatment. Moreover, for the heavy actinide elements, such as uranium, an appropriate consideration of relativistic effects is required.

Ab-initio molecular dynamics

Nowadays, it is possible to calculate the electronic structure of an atomic configuration consisting of about 100 atoms in less than a minute, on a supercomputer using advanced implementations of a DFT method [1]. The actual potential of the system is calculated on-the-fly, based on first principles. The energy and the forces on all atoms are computed, which allows a propagation of the system in time by integrating Newton's equation of motion. An integrator time step of the order of a femtosecond is needed, due to the rapid motion of the atoms. This is a quite short interval, but many chemical reactions take place on a femtosecond (10^{-15} s) time scale, and simulation times of a few tens of picoseconds (10^{-12} s) are often sufficient to simulate a reaction, giving insight at the atomic level into elementary chemical processes. The upcoming SwissFEL experiments will allow comparison between experiment and simulation on the same time scale, allowing further validation to be made of the applied simulation techniques and their underlying theoretical methods.

Simulation of nuclear fuels

Nuclear fuels consist of actinide materials, but experiments with such materials are difficult and very expensive, especially when irradiated material has to be studied. Computer simulations using DFT methods provide an alternative way of obtaining reliable data for these materials, which can then be used as input parameters for fuel performances codes. In this way, a direct link is established from the atomistic scale to macroscopic simulation methods, which are employed for safety evaluation of nuclear facilities. Accordingly, the development, validation, and application of new computational tools is required, exploiting the performance of current cutting-edge supercomputing facilities. This is the main goal of the Materials Simulation Group within LRS, and a new activity of the STARS project. The CP2K program package [2] for atomistic simulations is being actively developed in the framework of an open-source project, focusing on its application to actinide materials such as uranium dioxide (UO_2), which is technologically one of the most important actinide materials, because it is the main component of currently employed nuclear fuels. Figure 2 shows the fluorite structure of pristine UO_2.

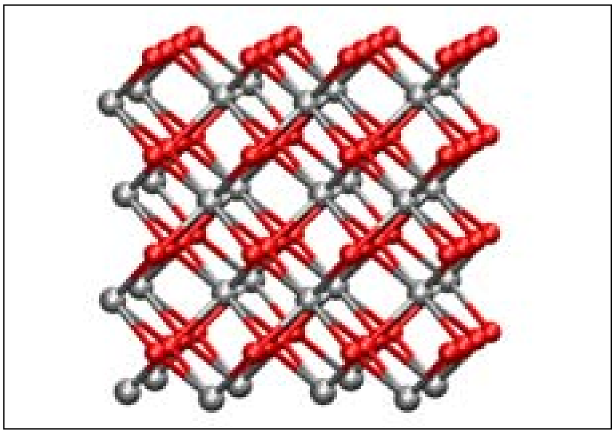


Figure 2: **UO_2 (U grey, O red) fluorite structure at 0 K.**

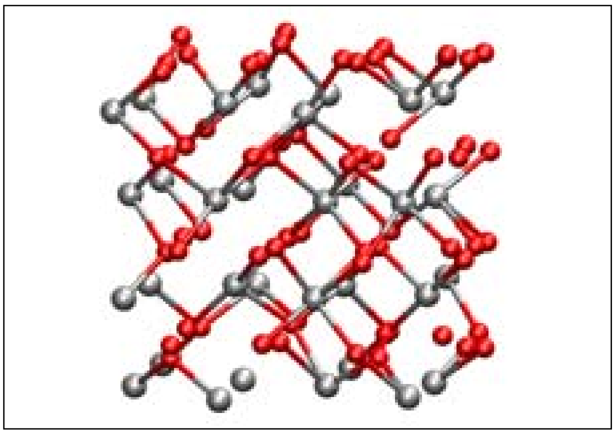


Figure 3: **Snapshot from a molecular dynamics simulation of pristine UO_2 at 1 bar and 1500 K.**

This sample was "heated" to 1500 K at 1 bar in the computer using the ab-initio molecular dynamics scheme implemented in CP2K. The oxygen sublattice already exhibits at this temperature a much higher disorder than the uranium sublattice, as shown in Figure 3.

This work is being performed within the framework of the EU FP7 project F-BRIDGE [3].

References

[1] T. D. Kühne, M. Krack, F. R. Mohamed, and M. Parrinello, Phys. Rev. Lett. **98** 066401 (2007).

[2] http://cp2k.berlios.de

[3] http://www.f-bridge.eu

Turbulent mixing of stratified fluid layers – a wide-spread and often safety-relevant flow phenomenon

Domenico Paladino, Michele Andreani, Guillaume Mignot, Ralf Kapulla, Robert Zboray, Nejdet Erkan, Jürren Fokken, Horst-Michael Prasser, *Laboratory for Thermal Hydraulics (LTH), PSI*

In the containment vessel of a light water reactor (LWR), hydrogen may appear during a postulated severe accident. Since hydrogen poses the risk of detonation and/or deflagration, the accurate prediction of hydrogen distribution in the containment has safety relevance. Gas mixing and stratification influence the hydrogen distribution in the containment and the OECD SETH-2 project with its PANDA tests addresses these phenomena. LTH complements its large-scale PANDA tests with dedicated small-scale experiments equipped with innovative measuring techniques, to address fundamental aspects of turbulence mixing modelling in the presence of density gradients.

The phenomena of mixing and stratification are widespread in nuclear applications. The mixing of coolant streams in T-junctions in parts of the reactor circuit during emergency core cooling water injection and in the outlet duct of high-temperature reactors are some examples.

Mixing and stratification also take place in the containment during a postulated accident with core degradation, when hydrogen, steam and air are present together. Gas stratification can lead to local increase in hydrogen concentration and to the formation of mixtures which could cause detonation and/or deflagration. Mass and heat sources/sinks, e.g. steam released from the primary circuit during a Loss of Coolant Accident (LOCA), water injection by the spray system, heat release caused by the functioning of catalytic hydrogen recombiners, or heat removed by containment coolers, induce turbulent flows, which promote mixing and the destruction of hydrogen-rich regions in the containment. The prediction of formation and destruction of hydrogen-rich regions in an LWR containment is a challenging task for advanced reactor system codes and for 3D Computational Fluid Dynamics (CFD) codes. In the framework of the OECD/SETH-2 project, an experimental programme on-going in the PANDA facility [1] addresses the scenarios leading to mixing of an initially stratified containment gas atmosphere by heat and mass sources. New experiments aim to create data for a database suitable for the assessment and validation of advanced computational tools. The use of the large-scale, multi-compartment PANDA facility permits the performing of tests at a scale comparable to that of LWR containment compartments.

LTH complements the investigations in PANDA with facilities having simplified, small-scale geometries and high-resolution instrumentation, as the data obtained by these facilities are more suitable for the improvement of numerical turbulence models. One of these facilities consists of a horizontal channel with square cross-section, in which two liquid streams of different density mix downstream of a splitter plate that separates the upper and lower halves of the channel in the inlet section. This channel, called GEMIX (GEneric MIXing), is instrumented with a combination of different, high-resolution measuring techniques. Laser methods, in particular Particle Imaging Velocimetry (PIV) and the technique of Laser Induced Fluorescence (LIF), are combined with wire-mesh sensors and wall sensors. All these together allow the acquisition of data characterising the flow field and the distribution of the transport scalar describing the progress of mixing, with a resolution showing details of the turbulent structures close to the stratification layer. Experimental results allow the accurate visualization and parametric characterization of a turbulent mixing layer, in particular the density gradient effect on the enhancement or suppression of turbulence. The statistical evaluation of such experimental data, coupled with accompanying fundamental modelling efforts using techniques such as Direct Numerical Simulation (DNS) and Large Eddy Simulation (LES), is directed towards improving the turbulence models in CFD codes, as well as in 3D system codes used currently for containment analysis. An important side issue is that these small-scale tests are especially good sources of scientific topics for student projects.

Students of the new course for a Master's Degree in Nuclear Engineering, recently launched jointly by ETH Zurich and EPF Lausanne, are regularly involved in these activities.

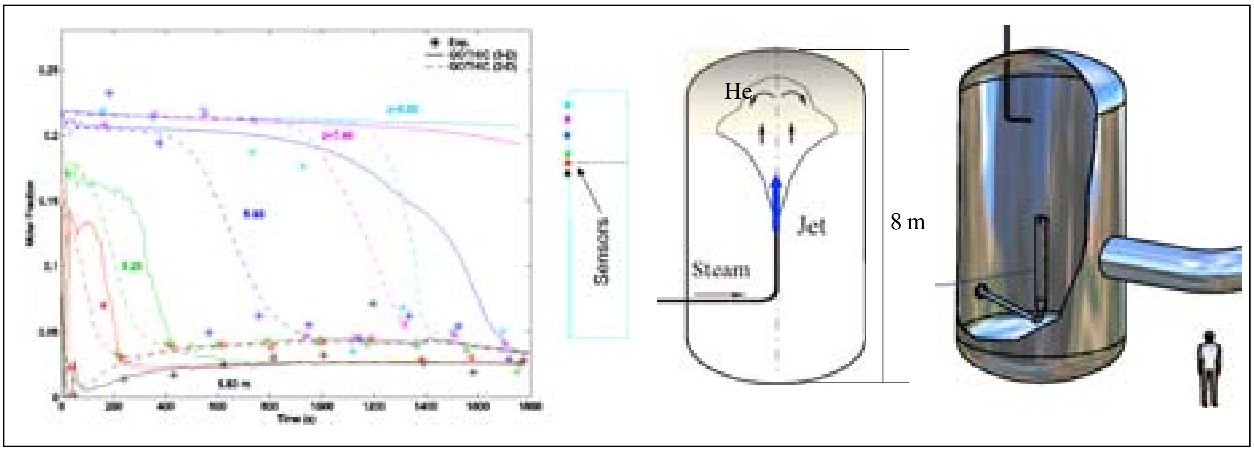


Figure 1: **Simulation of a PANDA test with the GOTHIC code.**

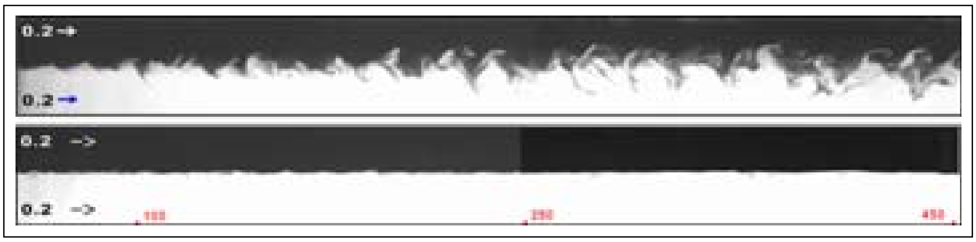


Figure 2: **Isokinetic mixing in the GEMIX facility.**

PANDA investigations and simulations

The conditions investigated in the OECD SETH-2 PANDA tests (geometry of injection, extent of helium-steam layer, composition, Froude number, temperature, pressure, etc.) are representative for typical accident conditions. An example of simulation of the experimental data is shown in Figure 1, where results using the GOTHIC code with 2D and 3D representations are presented, with two different modelling mesh resolutions. The 2D fine-mesh representation predicts the destruction of the stratification after about 1400 s, while the 3D coarse mesh simulation predicts stratification remaining even at 1800 s. The participants in the SETH-2 project (regulatory authorities, industry and national (research) institutions) also use these PANDA test results for their own validation of other codes, such as FLUENT, CFX, GASFLOW, ASTEC, TONUS, and CAST-3M. Figure 1 is related to one test belonging to the SETH-2 series named "Vertical Fluid Release". Other SETH-2 PANDA test series are related to the influence of horizontal fluid release, containment spray, containment cooler, hydrogen-oxygen recombiner, rupture disks, and the Integral Passive Containment Cooling system.

Stratified isokinetic layer tests in GEMIX

Current water mixing experiments in the GEMIX facility [2] are focused on the basic mechanisms of turbulent mixing in the presence of strong temperature and/or density gradients under isokinetic velocity conditions. The non-stratified concentration field (upper image, Figure 2) is considerably altered in the presence of stable density stratification (lower image, Figure 2).

Due to entrainment, the mixing region grows with downstream distance for the non-stratified case, while this growth is almost completely suppressed for the stratified case, i.e. the turbulent mixing in a vertical direction (and consequent entrainment) is considerably reduced.

Mixing and stratification of liquids and gases are phenomena which can occur in many different parts of nuclear power plants and energetic installations in general, and therefore the findings of these research activities have a broad range of application.

References

[1] G. Mignot, R. Kapulla, R. Zboray, N. Erkan and D. Paladino, *Overview of vertical fluid release series* In: The 13th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), Kanazawa City, Ishikawa Prefecture, Japan, September 27–October 2, 2009.

[2] J. Fokken, R. Kapulla, S. Kuhn, C. Dyck and H.-M. Prasser, *Stably stratified Isokinetic Turbulent Mixing Layers: Comparison of PIV Measurements and Numerical Calculation*, Fachtagung "Lasermethoden in der Ströungsmesstechnik", Erlangen, September 8-10, 2009.

New measurement of the half-life of ^{60}Fe

Ines Günther-Leopold, Niko Kivel, *Hot Laboratory, PSI;* Dorothea Schumann, Regin Weinreich, *Laboratory for Radiochemistry and Environmental Chemistry, PSI;* Michael Wohlmuther, *Laboratory for Accelerator Operation and Development, PSI;* Georg Rugel, Thomas Faestermann, Klaus Knie, Gunther Korschinek, Mikhail Poutivtsev, *Technische Universität München, Physik Department, Germany*

In a collaborative project between the Technische Universität München and PSI, a new value of $(2.62 \pm 0.04) \times 10^6$ yr for the half-life of ^{60}Fe has been determined – significantly above the previously accepted value of $(1.49 \pm 0.27) \times 10^6$ yr. This has a significant impact on the interpretation of formation time scales in the early Solar System. The ^{60}Fe sample used had been extracted from a copper beam dump irradiated for more than ten years with high-energy protons at PSI. The main experimental methods used in this study were gamma spectrometry and multi-collector inductively coupled plasma mass spectrometry.

Knowing the properties of radioactive nuclei produced by astrophysical processes is a key to understanding the development of our Universe, and the half-life of ^{60}Fe plays an important role in different astrophysical investigations. Most prominent examples are the nucleosynthesis in the current Galaxy as observed through gamma rays, the history of the early Solar System as observed through meteoritic inclusions, and deposits of supernova ejecta on Earth as indicated in ocean-crust material.

Before the investigations described in the present article, two measurements of the half-life of ^{60}Fe had been reported: 3×10^5 yr (uncertain by a factor of 3) [1], and $(1.49 \pm 0.27) \times 10^6$ yr [2], which has been the accepted value until now. Obviously, a more accurate determination of the ^{60}Fe half-life is in great demand and might have significant impact on the interpretation of astrophysical data.

In general, half-life determinations can be performed by measuring for a sample the two components of equation (1): A – ^{60}Fe activity, and N – number of ^{60}Fe atoms:

$$T_{1/2} = \frac{N}{A} \cdot \ln 2 \qquad (1)$$

Sample preparation

A ^{60}Fe sample was extracted from a copper beam dump operated at PSI between 1980 and 1992. In 2004, when the short-lived radionuclides had decayed, the chemical separation of iron from the bulk material, as well as from the main contaminant ^{60}Co, was performed by the Rad Waste Analytics group at PSI using liquid-liquid extraction and precipitation techniques [3].

About one order of magnitude more ^{60}Fe material was available for investigation compared with Ref. [2].

Activity measurement

The activity, A, of the ^{60}Fe sample was determined by scientists from the TU München in a shallow underground laboratory with a shielding of 15 m water equivalent, to reduce cosmic-ray induced background. The activity of the sample was monitored for almost 1000 days by the grow-in of the daughter isotope ^{60}Co via the two prominent gamma ray lines of 1.17 and 1.33 MeV (Figure 1).

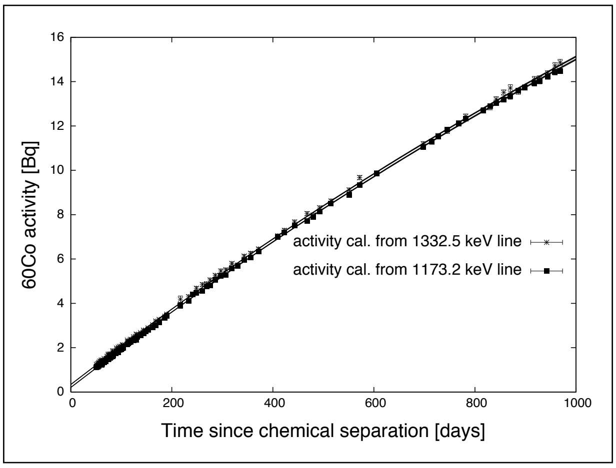


Figure 1: **Activity of the two ^{60}Co lines as a function of time.**

Figure 2: **MC-ICP-MS in the PSI Hot Laboratory.**

The measurement of both ^{60}Co lines yielded a value of A_{60Fe} = (49.19 ± 0.11) Bq, with an initial ^{60}Co activity of 0.2 Bq (background in the sample).

Measurement of the number of atoms

The number of ^{60}Fe atoms was determined from the sample by the Isotope and Elemental Analysis group of the PSI Hot Laboratory using a multicollector inductively coupled plasma mass spectrometer (MC-ICP-MS, Neptune, Thermo Fisher Scientific, Bremen, Germany, Figure 2) with a desolvating sample introduction system for higher sensitivity [4, 5].
For the determination of the number of atoms of ^{60}Fe, a master sample aliquot of 100 mg was taken and diluted with 3% nitric acid to approx. 4 µg/g. In order to calibrate the system, a certified reference material (IRMM-014) was prepared in the same manner, to match the matrix and achieve similar signal intensities. The method of isotope dilution (ID) was used for the quantification, and the analyte solutions prepared as five replicates, with different spiking ratios from $^{57}Fe/^{56}Fe = 1.5$ to 0.75, to eliminate systematic error. As the analysis procedure, the standard-sample bracketing method was used. With this method, potential drifts of the mass spectrometer can be detected and the data corrected for these drifts. All data were corrected for background, mass bias, and isobaric interferences (including ^{60}Ni).
The iron concentration in the ID sample was determined to be 585.6 ± 1.6 µg/g, corresponding to 2.662 ± 0.009 mg of iron in the master sample. The ratio N_{60Fe}/N_{Fe} was determined to be $(2.0483 \pm 0.0035) \times 10^{-4}$. Therefore, the number N_{60Fe} in the master sample was determined to be $(5.873 \pm 0.020) \times 10^{15}$.

Results and conclusion

Using equation (1), a half-life of ^{60}Fe of $(2.62 \pm 0.04) \times 10^6$ yr was calculated, based on the measured quantities [6]. This new value is much more precise (1.5% relative uncertainty) and significantly larger than that currently accepted.
An understanding of the early history of the Solar System needs knowledge of the precise half-life of ^{60}Fe. Since the new determination of the half-life yields a 1.76 times higher value than the one accepted until now, all models of the Solar System now have to be critically reviewed.
Furthermore, it is planned in the near future to extract an even larger amount of ^{60}Fe from the copper beam dump and send subsamples of this material to interested laboratories worldwide, to allow a cross-check of the determined half-life within the scientific community.

References

[1] J. Roy, T. Kohman, Can. J. Phys. **35** 649 (1957).
[2] W. Kutschera et al., Nucl. Instrum. Methods Phys. Res., Sect. B **5** 430 (1984).
[3] D. Schumann, J. Neuhausen, J. Phys. G **35** 014046 (2008).
[4] S. Weyer, J. Schwieters, Int. J. Mass Spectrom. **226** 355 (2003).
[5] I. Günther-Leopold et al., Anal. Bioanal. Chem. **390** 503 (2008).
[6] G. Rugel et al., Phys. Rev. Lett. **103** 072502 (2009).

X-ray micro-diffraction on 100 000-year-old natural cementitious materials

Dmitry Popov, Rainer Dähn, Erich Wieland, *Laboratory for Waste Management (LES), PSI;* Daniel Grolimund, *Swiss Light Source, PSI;* Philip Pattison, *EPFL, Lausanne, and ESRF/SNBL, Grenoble;* Urs Mäder, *University of Bern*

A key matrix for the safe disposal of radioactive wastes is cement, which is used to solidify waste and to construct engineered barrier systems in planned, deep, geological repositories. Investigations on natural analogue samples afford a unique opportunity to extend the present knowledge on the long-term behaviour of a cementitious near field, which is mainly based on laboratory and field studies carried out over at most a few years, to geological timescales of more than 100 000 years. Recent improvements in X-ray optics and detectors make micro-diffraction a powerful tool for investigations on highly heterogeneous systems.

Cement-based materials play an important role in multi-barrier concepts being developed worldwide for the safe disposal of radioactive waste. For example, ~95 wt% of the near field of the planned Swiss disposal cavern for low and intermediate level waste consists of cementitious materials. In a deep geological repository, very strong chemical gradients control mineral alterations at the interface between the cementitious near field (pH >12.5) and the surrounding claystone formations (pH 7–8), due to large differences in the respective chemical conditions. The interaction of the hyperalkaline pore water of the cementitious near field with the surrounding host rock changes the physical and geochemical properties at the interface. To date, experimental knowledge on the chemical reactions occurring, and the minerals formed in the alteration zone, is almost completely lacking.

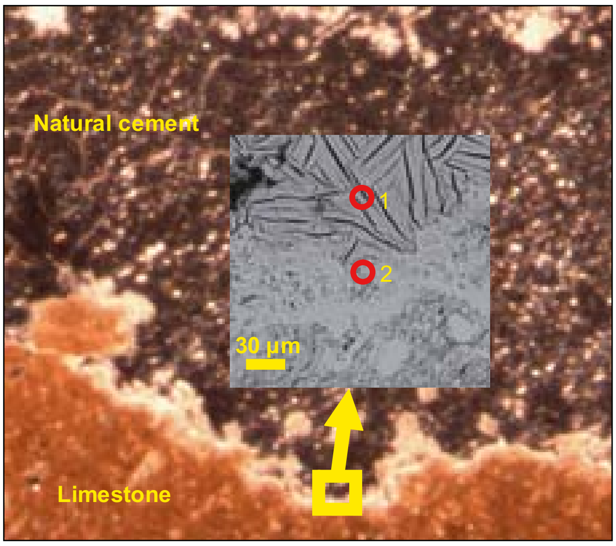


Figure 1: **Optical image of a more than 100 000-year-old alteration zone formed between a natural cement and limestone, a sedimentary rock. The inset shows a scanning electron microscope (SEM) image of the interface, illustrating the length scale and morphology of different mineral phases, which were analyzed by X-ray micro-diffraction (micro-XRD).**

Laboratory experiments have been successful in following diffusion-controlled alteration zones, but the identity of secondary minerals formed could only be established to a limited extent [1]. Complementary to the information from short-term laboratory and multi-year field experiments, information on the nature of alteration products at the cement/surrounding rock interface can be gained from natural analogues, which have been developed over time periods relevant to geological disposal. The most important natural hyperalkaline system was discovered at Maqarin (Jordan), and had been studied for more than a decade [2, 3]. There, high temperature and ambient pressure conditions led to the formation of clinker, and following subsequent re-hydration, to the formation of cementitious phases. U-Th disequilibrium series dating suggested an age of the cement mineralization of ~100 000 years. Continuous leaching along fracture-bound groundwater flow-paths formed cementitious in-fills, interfaces to the adjacent clay-bearing limestone (Figure 1).

The inset in Figure 1 shows the SEM image of an alteration zone which has a thickness of ~30-50 µm. The aim of this study was to determine the mineral composition and the spatial heterogeneity on compact samples (thin sections) prepared from the cement/limestone interface. Micro-XRD was applied because it is capable of providing basic structural information from selected micron- and sub-micron-sized crystals within complex matrices.

Micro-XRD investigations

Initial XRD characterizations were carried out using an unfocused beam, collimated down to 200×100 µm², at the CRISTAL beamline at the French synchrotron light source SOLEIL, France. XRD images collected with the unfocused beam exhibited only a few, very weak, diffraction lines. This can be attributed to the presence of large amounts of amorphous components in the sample. A search in the PDF-2 database identified the diffraction lines observed with the unfocused beam to match the (100), (004), (008), (0012) reflections of ettringite ($Ca_6Al_2(SO_4)_3(OH)_{12} \cdot 26H_2O$).

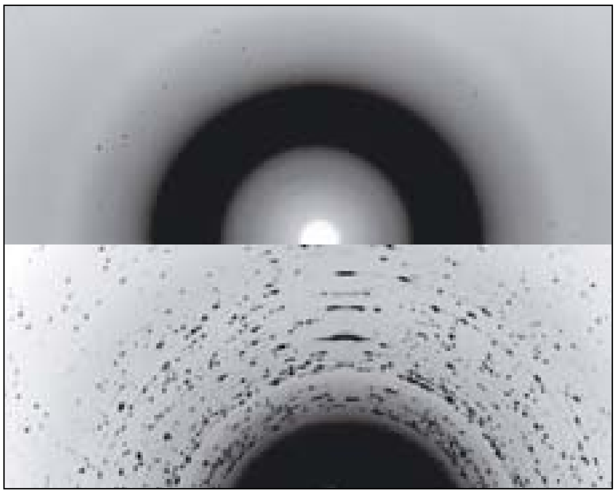


Figure 2: **Comparison of XRD data for ettringite (spot 1 in Fig. 1) collected with beam sizes of 200 ×100 µm² (top) and 10 × 10 µm² (bottom).**

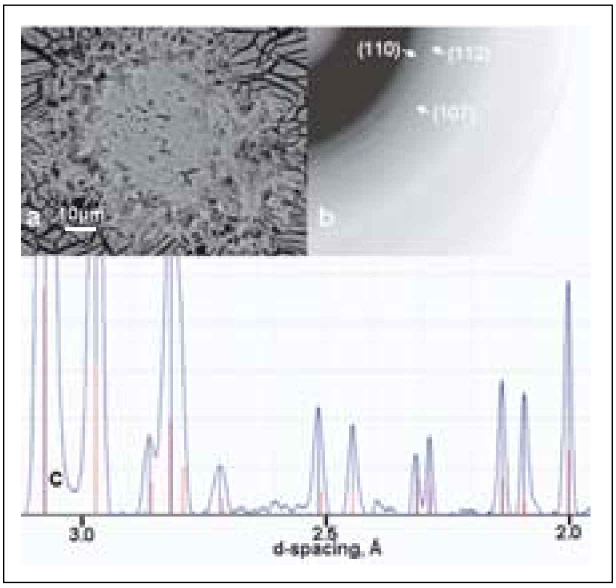


Figure 3: **Characterization of a C-S-H-area of the alteration zone: a) SEM image; b) micro-diffraction pattern and c) one-dimensional diffraction diagram of 11 Å tobermorite. Diffraction lines shown in red were predicted from the structure.**

Micro-XRD techniques were applied to improve the resolution of the XRD data, with the aim of performing a single crystal refinement. The microXAS beamline at the SLS delivers an intense X-ray beam with a spatial resolution down to 1×1 µm². The availability of state-of-the-art XRD detectors (such as PILATUS) made this beamline crucial for this study. In contrast to measurements with the unfocused beam, micro-XRD patterns collected using the micro-beam exhibited strong diffraction spots of ettringite (Figure 2), consistent with the hexagonal translation lattice (a=11.23 Å, c=21.48 Å).

SEM investigations of the interface between the limestone and the cement further showed small (~1 µm), platelet-like structures, consisting mainly of Ca, Si, Al, O (Figure 3). The secondary phases formed at the interface (spot 2 in Fig. 1) were identified as 11 Å tobermorite, a crystalline calcium silicate hydrate (C-S-H) mineral (space group I2mm, a=5.58 Å, b=3.69 Å, c=22.85 Å). Previous studies on 11 Å tobermorite, which were performed on larger crystals, showed that the mineral exhibits significant ordering-disordering (OD) features [4]. Application of the OD approach on the micro-XRD data from micron-sized crystals revealed a strong stacking disorder of 11 Å tobermorite. To the best of our knowledge, this study was the first in-situ study on naturally formed, micron-sized tobermorite crystals and was only feasible with a high-brilliance, highly focused X-ray source such as that available at the microXAS beamline of the SLS.

References

[1] M. Adler et al., Swiss Bulletin of Mineralogy and Petrology **79** 445 (1999).

[2] U. Mäder et al., Proceedings WRI-10. Balkema, 185 (2001).

[3] A. E. Milodowski et al. Proceedings WRI-10. Balkema, 1347 (2001).

[4] S. Merlino, E. Bonaccorsi and T. Armbruster, European Journal of Mineralogy **13** 577-590 (2001).

From Fe-Cr to steel: Atomistic calculations of binary Fe-Cr alloys

Anne-Christine Uldry, Maria Samaras, Max Victoria, Wolfgang Hoffelner,
High Temperature Materials Project, Laboratory for Nuclear Materials, PSI

The suitability of Fe-Cr steels in the 2 to 20 at%Cr concentration range as structural material for the next generation of nuclear power plants is under discussion. In the context of materials design through modelling, first-principles atomistic calculations are being performed on the pure Fe-Cr alloy in order to investigate the preferred configurations of Fe and Cr atoms as a function of the Cr concentration. A tendency of the Cr atoms to cluster beyond 12.5 at%Cr is observed and also characterised by a short-range order parameter. The inclusion of carbon is expected to shed some light on precipitations in realistic steels.

Cheap and abundant, iron (Fe) is also incredibly versatile. Its interdependent magnetic, structural and mechanical properties can be drastically altered by alloying with other elements. Hard steels can be formed by the inclusion of small amounts of carbon (C), and corrosion-resistant steels by the further addition of chromium (Cr). Recent years have seen a renewed interest in understanding and developing new Fe-Cr-based steels in view of the challenges posed by the requirements for structural materials for future nuclear power plants (both fission and fusion). It is within the context of materials design and predicting the long-term effects of irradiation and harsh environments on materials that modelling is expected to play a crucial role [1]. Computations within Density Functional Theory (DFT) form the basis of multi-scale modelling and a means of gaining insight at a fundamental level into the mechanisms at play in Fe-based alloys.

Cr in Fe: The reluctant solute

While the main features of the phase diagram of the pure, unirradiated Fe-Cr model alloy are widely accepted, many of its details are still under investigation [2]. This is in particular the case at the onset of a Cr-rich phase known to form at low Cr concentrations and up to temperatures relevant to nuclear power plant operation. Magnetic interactions play a major role in the ability of the Cr atoms to form a solid solution with Fe or to exhibit a tendency to cluster, depending on the Cr content [3]. The ground state of pure Fe is ferromagnetic, while that of pure Cr is described by an antiferromagnetic spin-density wave. The substitution of Fe atoms by Cr atoms therefore creates situations of magnetic frustration, and it is to be expected that the preferred configurations for the Fe and Cr atoms will be heavily constrained by magnetism at any given Cr concentrations. Configurations of lowest energy can be searched and studied by spin-polarised total energy DFT calculations, by means of the supercell approach.

Density Functional Theory calculations

Possible ways to treat random alloys have traditionally included the virtual-crystal approximation and the coherent-potential approximation. These are mean-field approaches and therefore not suitable when the details of the local environments are expected to play a key role. An appropriate method in these circumstances is the construction of supercells (repeated BCC unit cells in all spatial directions). The total energy of a range of different Cr arrangements is calculated and used as the discriminating criterion. Figure 1 shows the lowest energy structures that were found using the pro-

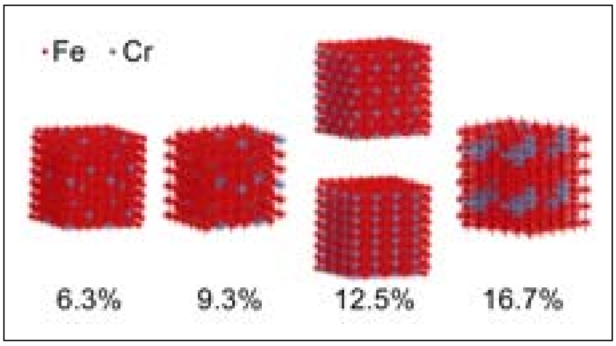


Figure 1: **Representation of the lowest energy structures found for 6.3, 9.3, 12.5 and 16.7 at%Cr alloys.**

jector-augmented wave implementation of the code VASP [4]. A clear tendency of the Cr atoms to cluster is evident at 16.7 at%Cr. In contrast, at both 6.3 at%Cr and 9.3 at%Cr the Cr atoms tend to be more spaced out. The 12.5 at%Cr has characteristics of transitional behaviour, with two different structures having near-degenerate energies after relaxation of the ionic positions. While no guarantee exists that these structures correspond to an absolute energetic minimum, good consistency of results is obtained through the range of supercell sizes tested (up to 4×4×4).

Short-range ordering versus clustering

A quantitative means of qualifying the configurations of Cr and Fe atoms at a given concentration is by calculating the so-called short-range order parameter for each configuration. For the binary alloy $Fe_{1-x}Cr_x$, it can be defined per shell 'l' around a Cr atom as $\alpha^l = 1 - n_{Fe}^l / [(1\,x) n\_{pos}^l]$, where n_{Fe}^l is the number of Fe atoms in the l^{th} shell and n_{pos}^l is the total number of sites in this shell. This purely structural parameter is particularly relevant to Fe-Cr alloy, and can be measured experimentally by diffuse neutron scattering measurements [5], whose results are reproduced in Figure 2 (full circles).

In Figure 2, a negative short-range order parameter indicates short-range ordering, while a positive value reveals a tendency to cluster. Superimposed on the experimental measurements in Figure 2 are the calculated values from the lowest energy structures found by DFT, showing reasonable agreement between modelling at the lower end of the atomistic scale and experiments. This picture correlates with the calculation of formation energies [2] at low Cr concentrations, which predicts negative mixing enthalpies for Cr concentrations below 6%.

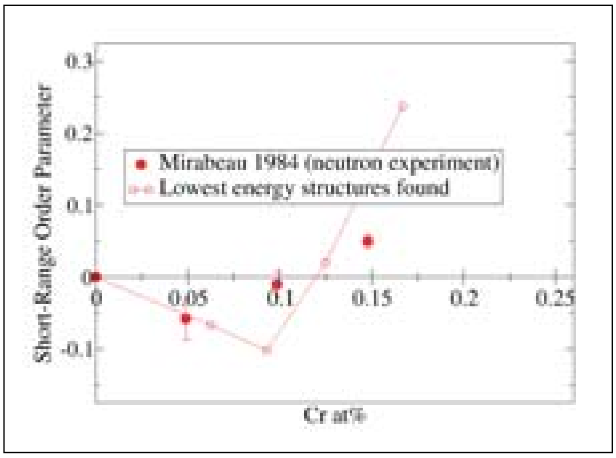


Figure 2: **Weighted (1st and 2nd shell) short-range order parameter; full circles as measured by Mirabeau [5], empty circles as calculated for the lowest energy structures. The line is simply a guide for the eye.**

Modelling steel

The ab-initio, first-principles calculations outlined above illustrate the concentration-dependent formation of Cr-rich regions in the pure Fe-Cr system. A further step towards the modelling of steel is the study of the effect of interstitial carbon impurities on the system. While a full understanding of the role of carbon on the mechanical properties of steel, both in normal environments and under irradiation, necessarily includes phenomena beyond the reach of DFT, static ab-initio calculations can provide insight into the formation of carbon precipitates. After analysing the large local deformation caused by the introduction of a single carbon atom in pure Fe, the affinity of the carbon for Fe or Cr was investigated on small supercells of the 12 at%Cr Fe-Cr system (Figure 3). A first round of calculations indicates a preference of the carbon for Fe over Cr, while nitrogen (another impurity commonly found in Fe) would prefer proximity to the Cr atoms. These results are preliminary and are part of our on-going work on these systems.

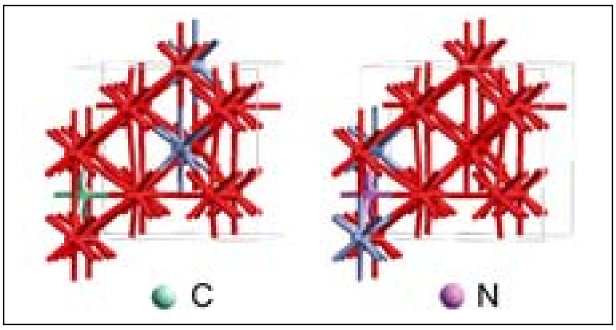


Figure 3: **2×2×2 supercells with 14 Fe, 2 Cr and either 1 C or 1 N.**

Conclusions

A quantitative description of impurities, both substitutional (Cr) and interstitial (C, N), and their impact on, and preferred configurations in, the Fe matrix has been obtained using first-principles calculations. These investigations illustrate the power of DFT calculations that can be used to predict material properties and, in the future, to design materials.

References

[1] M. Samaras, M. Victoria and W. Hoffelner, Nucl. Eng. Tech. **141** 1 (2009); M. Krack, *Approaching uranium dioxide from first principles,* present report

[2] P. Olsson, I. A. Abrikosov, L. Vitos and J. Wallenius, J. Nucl. Mater. **321** 84 (2003).

[3] T. P. C. Klaver, R. Drautz and M. W. Finnis, Phys. Rev. B **74** 094435 (2006).

[4] G. Kresse and J. Hafner, Phys. Rev. B **47** R558 (1993).

[5] I. Mirabeau, M. Hennion and G. Parette, Phys. Rev. Letters **53** 687 (1984).

Organic aerosol in the atmosphere

André S. H. Prévôt, Peter F. DeCarlo, Valentin A. Lanz, Urs Baltensperger,
Laboratory of Atmospheric Chemistry, PSI

Organic particulate matter affects human health and climate forcing. The sources and evolution of organics are poorly characterized. High-time-resolution measurements in recent years across the globe in the northern hemisphere have shown that secondary organics formed in the atmosphere are most of the time more important than the emitted primary organic aerosols. A new model framework is introduced using the measurable volatility and the degree of oxidation of organic gases and aerosols to describe the evolution of organics and their impact on climate, without the necessity of measuring each organic molecule individually.

The study of organic aerosols used to be frustrating for chemists. After years of instrumental development, only 10-30% of the particulate organic matter could be identified as specific compounds. The recently available aerosol mass spectrometer does not allow individual compounds to be identified, but provides organic mass spectra at high time resolution that

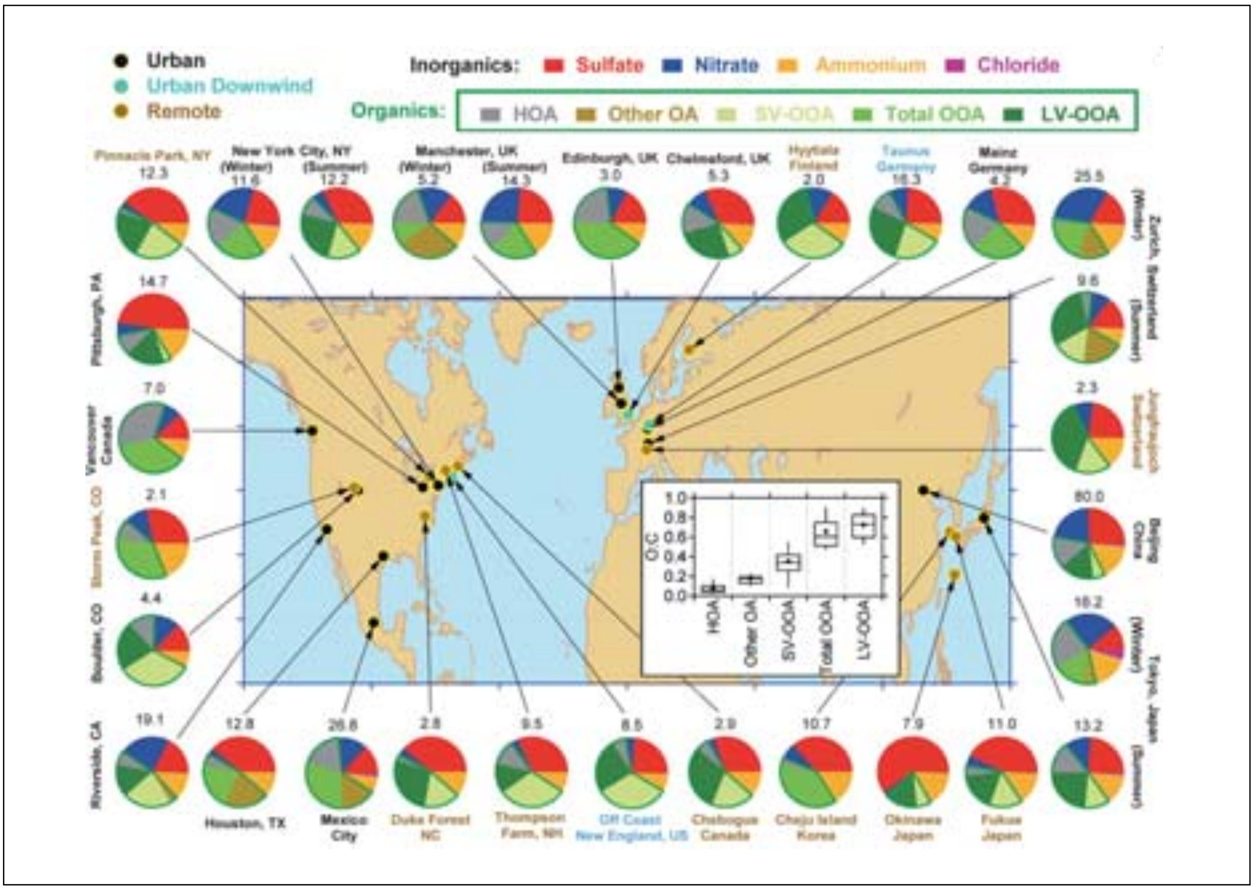


Figure 1: **Composition of particulate matter around the world in the northern hemisphere. HOA refers to fossil organic primary aerosol (often traffic), other OA includes wood burning and other sources, OOA refers to oxidized (mostly secondary) organic aerosol, while SV-OOA and LV-OOA refer to semivolatile and low-volatility OOA, respectively. The inset provides the atomic O:C ratios of the different organic components.**

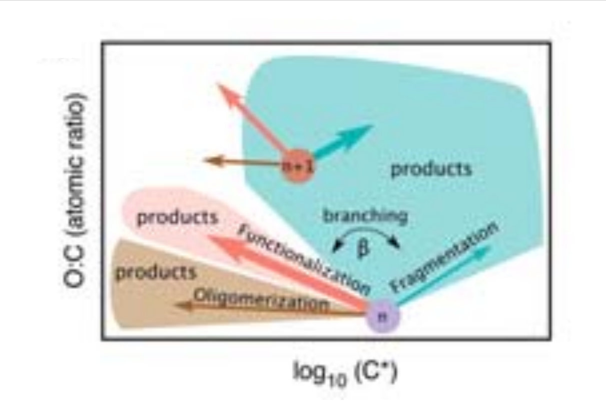


Figure 2: **Schematic of the pathways of organic molecules during photo-oxidation.**

can be attributed by clever statistical methods to specific sources or components, such as organics from traffic emission or wood burning, or secondary organic aerosols that are produced from the oxidation of organic trace gases. This method, originally developed in Switzerland, has been used at many locations in the northern hemisphere (Figure 1). It has been found that organic aerosols are, in general, an important component of particulate matter, and secondary organic aerosol (OOA) is often the dominant organic fraction.

As reported in our recent publication in Science [1], a new framework has been developed to characterize the evolution of organics without the need to measure all individual compounds. The organic molecules can be characterized by certain volatility and atomic O:C ratio bins. Atmospheric processing involves functionalization (e.g. adding acid groups to the organic molecules), oligomerization, and fragmentation reactions (break-up of molecules) (Figure 2). These reactions need to be parametrized and can then be used in regional and global models.

Besides the possibility of modelling the amount of organic aerosols, climate-relevant parameters are also directly linked to modelled parameters. Figure 3 shows that the O:C ratio is directly linked to the ability of the organic matter to take up water. This influences the ability of particles to form clouds, which in turn affects the earth's radiation budget and thus the climate. This link was found in smog-chamber experiments using individual precursors, such as the biogenic α-pinene and isoprene and the man-made trimethylbenzene, as well as in field campaigns with varying degrees of pollution at the Jungfraujoch and in Mexico City.

Outlook

In the future, the functionalization, oligomerization and fragmentation reactions need to be studied in more detail and quantified for different types of emissions and compounds. Also, other potential influences on the production of secondary organic aerosol, such as aqueous chemistry in aerosol-bound water and cloud droplets, will be studied. The importance of different sources for the production of secondary organic aerosols can be studied in smog chambers and in ambient air by combining aerosol mass spectrometry with other, only recently available, measuring techniques, such as ^{14}C analysis of the carbon in particulate matter, allowing fossil and non-fossil sources to be distinguished.

References

[1] J.L. Jimenez, A.S.H. Prevot, P.F. DeCarlo, V.A. Lanz, U. Baltensperger et al., Science **326** 1525-1529 (2009).

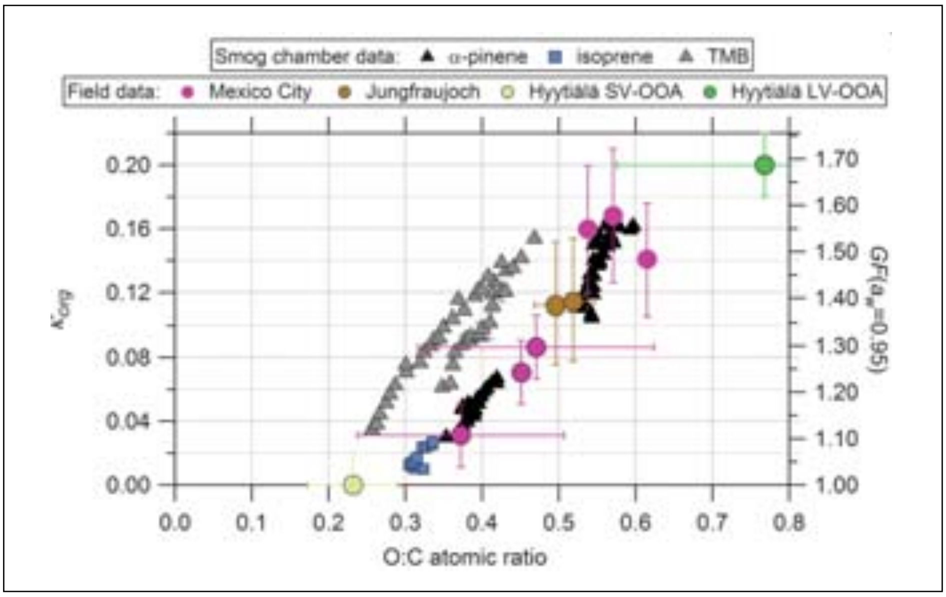


Figure 3: **Water uptake of organics (and thus their influence on cloud formation) versus the atomic O:C ratio for smog chamber experiments and field campaigns.**

Tracking trace gases in snow

Markus Ammann, Thorsten Bartels-Rausch, Adela Krepelova, Michael Kerbrat, *Laboratory of Radiochemistry and Environmental Chemistry, PSI and University of Bern;* Thomas Huthwelker, *Swiss Light Source, PSI*

The exchange of trace gases between air and snow has a wide range of effects on atmospheric composition, climate and ecosystems. Through a combination of analytical, radiochemical and X-ray spectroscopic techniques, we have disentangled the complex interplay between physical transport processes in highly porous snow and chemical transformations at the interface between ice and air, for several nitrogen oxide species. The results improve our capability to predict the relationship between snow chemistry and the ozone budget, to better assess the export of trace constituents into sensitive ecosystems and to better understand the way atmospheric trace constituents are trapped into ice archives, from which past climates are reconstructed.

Introduction

Permanent and perennial snow covers a significant fraction of Earth's land mass, at times more than 50% in the northern hemisphere. The exchange of trace gases between air and snow affects the local composition of the air, and contributes to the temporary or permanent removal of atmospheric trace constituents into snow and ice. In ice archives, such as polar or mid-latitude glacier ice cores, the concentration of these constituents is used to support the reconstruction of past climate and environmental chemistry. Snow also acts as a transfer medium for persistent pollutants by releasing trapped constituents into local, potentially sensitive, ecosystems upon snowmelt.

Nitrogen oxides are of relevance because they largely control the abundance of ozone in the atmosphere. Their exchange between snow and the atmosphere involves a complex interplay between physical transport processes in this highly porous medium, as well as chemical transformation at the interface between ice and interstitial air [1, 2]. The most important of these are the photolysis of nitrate leading to NO and NO_2 and the further reaction of NO_2 to nitrous acid (HONO). HONO is an important precursor of OH radicals – often referred to as the atmosphere's cleansing agent. Deciphering the nature of nitrate at the ice surface and the processes controlling the formation and transport of nitrous acid through snow is therefore important in understanding the interaction between the chemistries of snow and atmosphere.

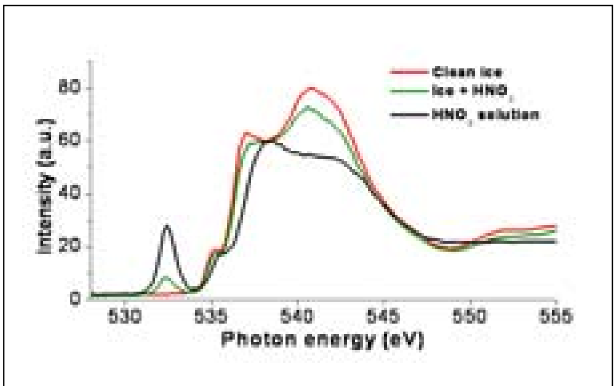


Figure 1: **Surface-sensitive X-ray absorption spectra of clean ice, nitrate doped ice and HNO_3 solution.**

Nitrate at the ice–air interface

We have used ambient-pressure X-ray photoelectron spectroscopy (XPS) and electron-yield near-edge X-ray absorption spectroscopy (NEXAFS) at the Advanced Light Source (ALS) to determine the concentration of nitrate and its hydrogen-bonding environment within the upper few nm of ice. Figure 1 compares oxygen K-edge NEXAFS spectra from clean ice, from ice doped with small amounts of nitrate and from a concentrated HNO_3 solution.

It appears that the spectrum under conditions of low nitrate coverage can be represented as a linear superposition of a clean ice spectrum and the HNO_3 solution spectrum. This indicates that the nitrate-doped ice surface consists of clean ice and nitrate ions that are coordinated as in a concentrated solution.

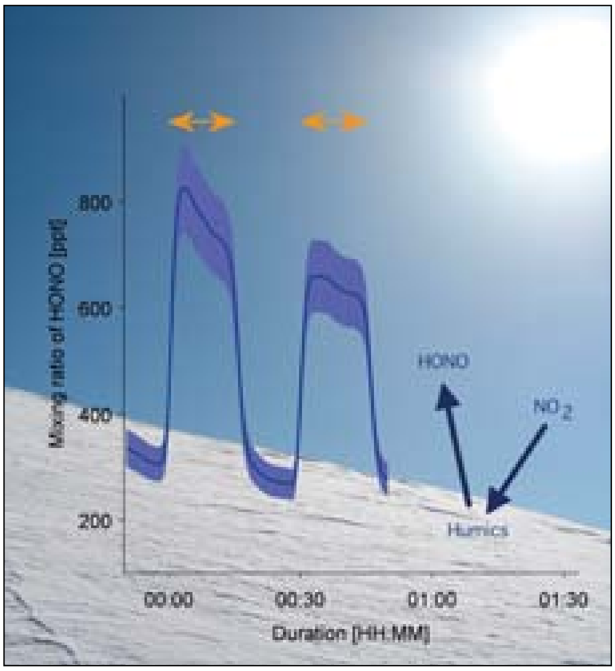


Figure 2: **Evolution of the HONO gas phase mixing ratio with time (solid line) after contact with humic acid doped ice. Two consecutive irradiation periods in the visible range (orange arrows) in the presence of NO_2 in the gas phase are shown. The shaded area illustrates the accuracy of the HONO measurement. Time zero denotes the beginning of the (first) irradiation period.**

Photosensitized formation of HONO

As mentioned above, the photolysis of nitrate leads to NO_2. Among other secondary processes, NO_2 can undergo reduction to HONO. We have previously established that this reduction may be photosensitized by humic acids, a class of organic materials ubiquitously present in the environment. Figure 2 shows that irradiation with visible light leads to a sharp increase of HONO in the air above a frozen humic acid solution. Experiments thus demonstrate that humics can transform NO_2 to HONO, even at cold temperatures and inside an ice matrix, assisted by solar radiation [3].

Diffusivity of HONO in snow

Finally, we addressed the question of how rapidly HONO, once formed, could migrate within the snow pack to reach the atmosphere. This experiment made use of the PROTRAC facility at PSI, which provides the short-lived radioactive isotope ^{13}N with which $HO^{13}NO$ was synthesized in our laboratory. A small flow containing the $HO^{13}NO$ was passed through the headspace above a snow surface in our novel snow diffusion chamber (SDC). The complex migration could now be monitored from outside using γ-detectors. The slope of the migration

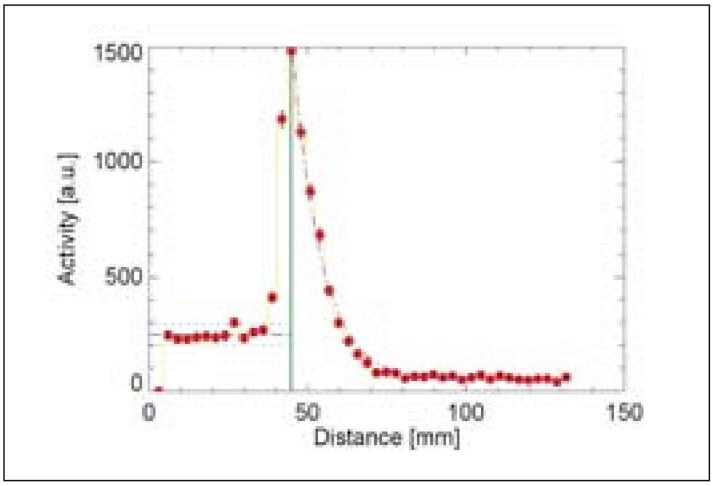


Figure 3: **^{13}N activity along the snow diffusion chamber as measured by the coincident γ-counter during exposure of the snow sample to $HO^{13}NO$. The solid line at 45 mm represents the gas/snow interface.**

profile shown in Figure 3 allows the net migration velocity of HONO along the snow sample to be directly retrieved, using the half-life of ^{13}N of 10 min as a stop watch. Analysis indicates that adsorption of HONO at the ice-air interface leads to about two orders of magnitude lower diffusivity than expected for diffusion alone of the same molecule in a medium with the same structure [4].

Acknowledgements

The experiments at the ALS (Lawrence Berkeley National Laboratory, Berkeley, USA) were conducted in collaboration with H. Bluhm and J.T. Newberg. Experiments with snow samples were performed in collaboration with B. Pinzer and M. Schneebeli at the WSL Institute of Snow and Avalanche Research, Davos, Switzerland, who also provided structural information about the snow samples to support the chemical experiments.

References

[1] T. Huthwelker, M. Ammann, T. Peter, Chemical Reviews **106** 1375 (2006).
[2] M. Kerbrat, T. Huthwelker, H. W. Gäggeler, et al., The Journal of Physical Chemistry C **114** 2208 (2010).
[3] T. Bartels-Rausch, M. Brigante, Y.F. Elshorbany et al., Atmospheric Environment, in press (2010).
[4] B.R. Pinzer, M. Kerbrat, T. Huthwelker et al., Journal of Geophyiscal Research **115** D03304, doi:10.1029/2009JD012459 (2010).

Climate change mitigation options for the global energy system

Hal Turton, *Laboratory for Energy Systems Analysis, Departments of General Energy and Nuclear Energy and Safety, PSI;* Bertrand Magne, *International Energy Agency, Paris;* Socrates Kypreos, *dysenos AG, Switzerland*

Current patterns of energy supply and use across the world are contributing to global climate change. The Energy Economics group at PSI has analysed scenarios of possible pathways for the future development of the global energy system that respond to this challenge by deploying new technologies to reduce greenhouse gas (GHG) emissions. This work has identified important technology options, such as carbon capture and storage, renewable energy (particularly biomass), nuclear energy and efficiency for achieving very low stabilization targets for atmospheric GHG concentrations, to support the development of policy in Europe.

The world today is confronted by a number of challenges arising from the supply and use of energy. Among these, climate change represents a major threat to long-term sustainable economic, social and environmental development. To forestall the most severe potential impacts from climate change, policy makers in Europe and elsewhere have set the goal of avoiding an increase of greater than 2°C in average global temperatures (above pre-industrial levels). Realizing such a target is likely to require technological change and the application of new technology options in the energy sector to substantially reduce greenhouse gas (GHG) emissions. However, questions remain as to whether existing and prospective energy technologies are sufficient to achieve such stringent targets, and which technology options are most suitable.

Approach and methodology

Analysis in the Energy Economics group in the Laboratory for Energy Systems Analysis at PSI has sought to address these questions by exploring scenarios that achieve stringent atmospheric GHG concentration targets (specifically, 550, 450 and 400 parts per million (ppm) carbon dioxide-equivalent) over the 21st century. These scenarios present 'what if' descriptions of the future that help to identify trends, robust technology strategies, interactions across the energy system, and potential unforeseen challenges. Such scenarios are not predictions, but rather possible and relevant future outcomes based on a set of clearly understood assumptions.
To quantify and analyze these scenarios, a global energy-economic integrated assessment model was applied. This model – MERGE-ETL – represents the energy sector and

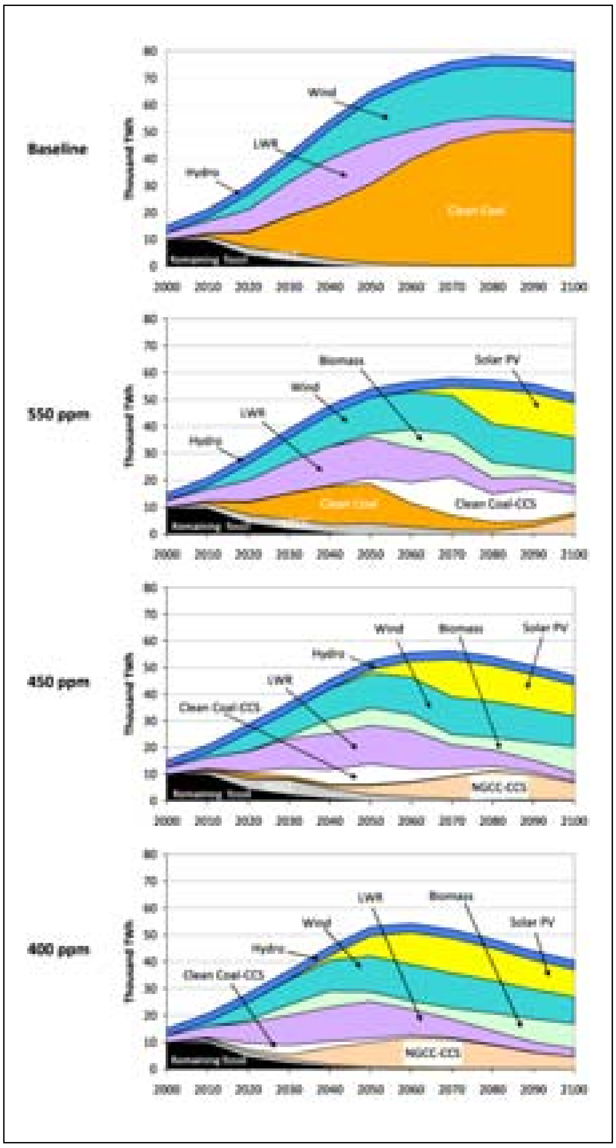


Figure 1: **Electricity output in mitigation scenarios.**

economy for nine regions covering all the countries in the world. MERGE-ETL estimates energy demand and selects technologies that are cost effective over the long term, so as to maximize global economic utility. The model includes a range of technology options for energy supply and conversion, covering fossil fuel power plants (both conventional and more advanced technologies), renewables and nuclear energy. In addition, PSI implemented 'technology learning' in this model – i.e. the process by which technologies improve as a result of research and development (R&D) or experience using and manufacturing a technology. Further, PSI implemented a more detailed representation of the nuclear fuel cycle to account for the constraints inherent in the management of fissile material stocks and the recycling of nuclear materials.

Selected results and conclusions

Four global scenarios for mitigation of climate change are presented in Figure 1. Each scenario considers a different target for atmospheric concentration of GHGs (ranging from 'Baseline', in which there is no target, down to a very stringent 400 ppm). Figure 1 shows the utility-maximizing set of technologies for global electricity generation in each scenario. We can see that responding to increasingly stringent climate change targets requires a number of technological developments. These include the large-scale adoption of carbon-free power plants and reductions in energy demand, mainly from improvements in efficiency. Under a 550ppm target, clean coal (integrated gasification combined cycle, or IGCC), nuclear power (light water reactors, or LWRs), wind farms, and biomass play an important role in the mid-term, with clean coal with carbon capture and storage (CCS) and renewables representing long-term options. Nuclear LWRs, biomass and CCS all face resource constraints given limited geological or land availability. Under the 450ppm and 400 ppm targets, clean coal technologies become significantly less competitive due to the stringency of the target (even with CCS, because not all emissions can be captured). In contrast, natural gas (NGCC) is more attractive early in the century, and maintains this position later with the adoption of CCS.
Overall, the results in Figure 1 show that major technological change is needed to realize very stringent mitigation targets, and new technologies are likely to play a significant role. Many such technologies are still somewhat immature, but are expected to become more competitive with increasing experience and further R&D. In all scenarios, technology learning plays an important role in bringing down the cost of new technologies (especially renewables and CCS), substantially reducing the economic costs of achieving the climate change targets.

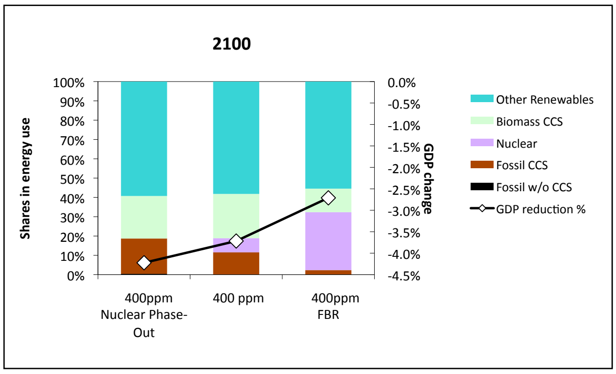


Figure 2: **Electricity generation shares for alternative nuclear scenarios, and GDP losses.**

Further analysis of future options was conducted focusing on the technologies identified above, to assess some of the uncertainties (such as the availability of CCS, nuclear power or biomass; or the rate of development for renewable technologies such as solar PV). Figure 2 focuses on the uncertainty over whether nuclear generation and advanced nuclear options (such as fast breeder reactors, or FBRs) will be available. Figure 2 shows the electricity generation mix in the year 2100 under a stringent climate target of 400pm, across three scenarios of nuclear availability. The figure also shows the economic cost of achieving this climate mitigation target under the three cases. The results indicate that this mitigation target can be achieved with a phase-out of nuclear power, but at significantly higher economic cost. On the other hand, the availability of advanced FBRs lowers the economic cost, reduces fossil fuel use and avoids the need to use expensive CCS options.
In summary, the results indicate that stringent mitigation targets can be met under many technology scenarios, but major technological change is needed. Important technology options include carbon capture, renewables (particularly biomass), nuclear energy and efficiency.

This analysis represents an extract of work for the European Commission as part of the ADAM (Adaptation and Mitigation Strategies: Supporting European Climate Policy) project [1].

References

[1] B. Magne, S. Kypreos, H. Turton, *Technology Options for Low Stabilization Pathways with MERGE*, The Energy Journal **31** (Special Issue 1. The Economics of Low Stabilization) 83-107 (2010).

User facilities

90 PSI accelerators

94 Swiss Light Source SLS

96 Spallation Neutron Source SINQ

98 Swiss Muon Source SμS

99 Ultracold Neutron Source

The Paul Scherrer Institute runs Switzerland's large-scale research facilities for users from the national and international scientific community, in particular for condensed matter, materials science and biology research. PSI is one of only two locations in the world providing the three complementary probes of synchrotron X-rays, neutrons and muons at one site.

Synchrotron X-rays are available at the Swiss Light Source (SLS) – a third-generation synchrotron light source based on a 2.4 GeV electron ring and providing photon beams of high brightness at 17 beamlines.

Neutrons are produced at the continuous spallation source SINQ – the only one of its kind worldwide. SINQ is a state-of-the-art user facility for neutron scattering and imaging with a suite of 13 instruments.

The Swiss Muon Source (SμS) is the world's most intense continuous muon source, with 6 beamlines available for experiments using muons as sensitive local magnetic probes. High-precision particle physics experiments use these unique beams to complement the LHC high-energy frontier experiments at CERN in investigating the limits of the Standard Model of particle physics.

Both SINQ and SμS are powered by a 590 MeV cyclotron that delivers a 1.3 MW proton beam (the world's highest average power proton beam).

In 2010, the suite of User Facilities will be extended by the Ultracold Neutron Source (UCN), and a few years later by the Swiss X-Ray Free-Electron Laser (SwissFEL), a new large-scale facility that will provide ultra-short, intense X-ray pulses for the investigation of fast processes and the determination of molecular structures.

In addition to the User Facilities at the accelerators, other PSI laboratories are also open to external users, e.g. the Hot Laboratory operated by the Nuclear Energy and Safety Department that allows experiments to be performed on highly radioactive samples.

◄ **Instrument scientist Jan Peter Embs preparing an experiment at the neutron source SINQ.**

Operation of the PSI Accelerator Facilities in 2009

Stefan Adam, Andreas Lüdeke, Anton C. Mezger, Marco Schippers, Mike Seidel
Department of Large Research Facilities, PSI

The Department of Large Research Facilities has responsibility for operation and development of all accelerator facilities at PSI. These are the High-Intensity Proton Facility, the Swiss Light Source, the Proscan medical accelerator and a low-energy facility driven by the Injector 1 cyclotron. This article covers operational aspects as well as performance highlights and new developments achieved in these facilities.

Operation and development of the high-intensity proton accelerator complex

The Swiss authorities approved a new operating licence with a raised beam current limit of 2.2 mA for standard operation and 2.4 mA for beam development. Operation at this current was established during 2009, with excursions up to 2.3 mA over some predefined periods (Figure 1). The overall availability of the facility was close to 90%, a value typical for recent years. As a result of the increased production current, the integrated charge values delivered (shown in Table 1) represent new record values in the history of the PSI proton accelerator. In the first third of the run period, it was not possible to achieve the full current, because enhanced losses were observed in the ring cyclotron. A misaligned vertical collimator was identified as the origin of these losses. The collimator was then removed during a regular service and, from then on, the accelerator was able to operate at full intensity.

Two major failures of the electrostatic injection and extraction devices inside the ring cyclotron occurred in weeks 25 (EIC) and 41 (EEC). During week 21, the performance of Injector II was disturbed by the collimator RIL2, that had mechanical problems and could not be set in a reproducible way. With modified operational settings, it was nevertheless possible to continue operation and postpone the repair until the next shutdown. On 22 December, the run period had to be terminated 2.5 shifts before its planned end, due to a major failure of site power. Figure 3 shows key figures on a weekly basis over 2009, such as availability, average production current, charge accumulated on the 4 cm meson production target, and the number of beam trips.

Towards the end of the run period, a new, 10th harmonic buncher in the 72 MeV transfer line was tested. Promising results were obtained for low currents, but at high currents the behaviour of the beam is still not well understood and more studies are required.

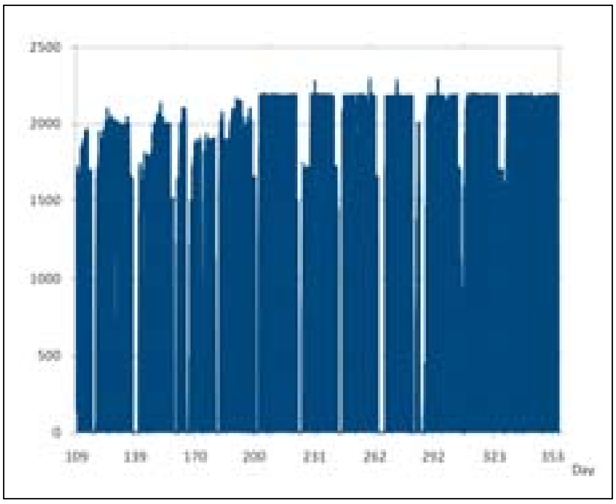


Figure 1: **Production current over the year 2009.**

Beam-time statistic for the high-intensity facility	2009
Total beam time	
to meson production targets	5120 h
to SINQ	4670 h
Beam integral	
total beam integral on Meson Targets	9.7 Ah
total beam integral on SINQ	6.2 Ah
Outage	
unscheduled outage longer than 5 minutes	336 h
total unscheduled outage	415 h
total outage [current below 1mA]	556 h
Availability	**89.5 %**

Table 1: **Beam-time statistics for the proton facility.**

In preparation for regular operation of the new source for ultracold neutrons, UCN, many short-pulse beam tests were performed on a temporary beam dump in the UCN beamline. In the week before Christmas, first short-pulse beam tests were performed on the UCN target itself, in order to verify the correct beam optics and to test the diagnostics and machine protection systems.

Failure analysis

The relative contributions of subsystems to downtimes in 2009 are shown in Figure 2. The longest interruptions were caused by electrostatic devices and failures in cooling circuits. Broken water hoses resulting from radiation damage will be avoided in the future by preventive replacement during shutdown. Controls and diagnostics problems are strongly coupled and their 13% contribution to downtime is higher than usual. The downtime caused by replacement of the filaments of the ion source is a systematic effect, since the filaments cannot survive the three-week period between service days. Although unavoidable, this downtime contributes to the statistical non-availability. However, this downtime will be eliminated by the planned replacement of the present ion source by a new ECR source during the 2009–2010 shutdown.

Improvement of cyclotron performance for patient treatment with PROSCAN

Since 2007, the PSI proton therapy facility has provided 250 MeV proton beams for patient treatment, continuously and throughout the year. Beam time is also used for commissioning of Gantry 2, the eye-treatment facility OPTIS2, irradiation at PIF and accelerator studies. The increase of operation

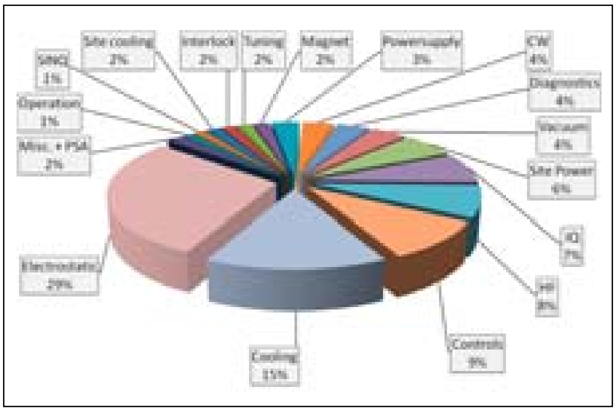


Figure 2: **Downtime characterization for outages in the p-facility longer than 5 minutes (ca. 340 hours).**

time of about 330 h to 5169 h in 2009 was mainly caused by preparations for starting treatment at OPTIS2. The total availability was 96%. The Center for Proton Therapy used 3468 h in 2009. The longest interruptions were caused by various faults in the RF amplifier, a mechanical defect at the vertical deflector in the cyclotron, and control problems after the installation of new software. As in previous years, scheduled maintenance was performed during Monday evenings and over six weekends, including the following Monday. In these cases, patients were treated the following Saturday. Accelerator developments concentrated on improvements to beam stability and reproducibility, and reduced wear of components by sputtering.

Changing the ion source chimney from molybdenum to tungsten has doubled its service interval and increased day-to-day reproducibility. Sputtering processes result in the removal of material from the so-called puller electrode at the ion source. This effect limits the lifetime of this expensive component to 4–5 months. A newly developed puller tip is now exchangeable and uses tungsten instead of copper (Figure 6). After 3 months, no wear from sputtering has been observed.

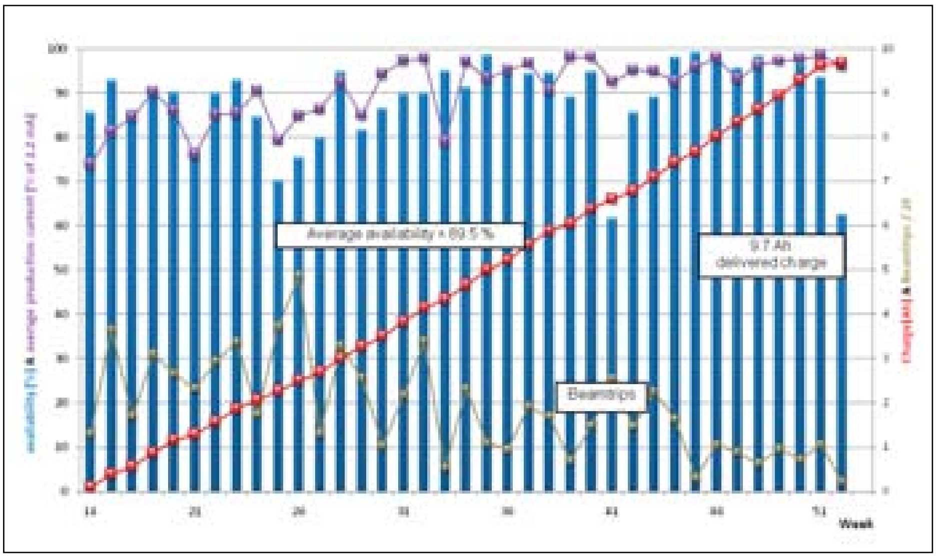


Figure 3: **Operation of the Proton Facility: availability, average current, delivered charge and beam trips.**

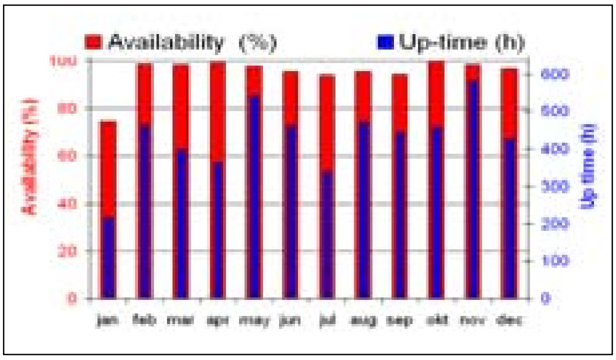


Figure 4: **Average operating hours per month and availability of PROSCAN in 2009.**

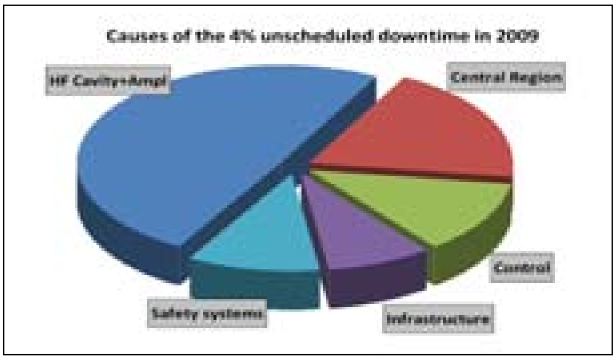


Figure 5: **Contributions of subsystems to downtime.**

To switch the beam between treatment areas, the extracted beam intensity must be changed quickly, which is not possible with the ion source. Therefore, phase slits at 20 cm radius in the cyclotron are used to vary the beam intensity. In order to keep activation and heat load at such components small, it is desirable to perform beam collimation at lower energies. To reduce the losses at the phase slits, studies have been performed to reduce the beam width. This has been achieved by a decrease and a shift of the aperture of a fixed slit in the first turn. Further improvements were obtained by modifying a vertical collimator. This collimator intercepts part of the beam in the first few turns, when deflected by means of the vertical deflector plates. Calculations of the positions of the beam at the collimator have been confirmed by foil-burn experiments. Following the calculations, the shape of the vertical collimator was matched to the locations and vertical sizes of the first few turns. These modifications contributed significantly to an increase of cyclotron performance and beam quality for treatment.

Development and operation of the SLS

The year 2009 has been the best year so far for the Swiss Light Source in terms of beam availability. With three days between beam outages on the average and a typical duration of an outage of only one hour, we reached an outstanding beam availability of 98.7%.

The main contributions to long beam outages in the past five years originated from four systems: shorting of the 16 kV grid transformers (95 hours); water leaks in the RF cavities (73 hours); the 3HC cryostat system (64 hours); and one broken RF coupler window (64 hours). All main transformers have now been replaced and it is suspected that their production series had systematic problems. The water flow in the cavities has been reduced, the water chemistry has been adjusted and new cavities have been ordered to address the water leak problems. More spare parts have been acquired for the 3rd harmonic cavities, but the system still remains one of the biggest risks for long outages of the SLS. Figure 7 clearly shows that these long outages dominate the downtime statistics of the past years.

The longest outage last year was caused by a water leak in a higher-order-mode coupler of a cavity. The RF group optimized their process for sealing leaks by using a new glue that dries within a few hours. As a result, average repair time was reduced from days to hours, which will ease the situation until the cavities can be replaced. The SLS operational statistics are summarized in Table 2.

Figure 6: **Damage of the puller nose due to loss of material by sputtering (left) has been decreased by applying a tungsten nose tip (middle) that does not show any degradation after 3 months of operation (right).**

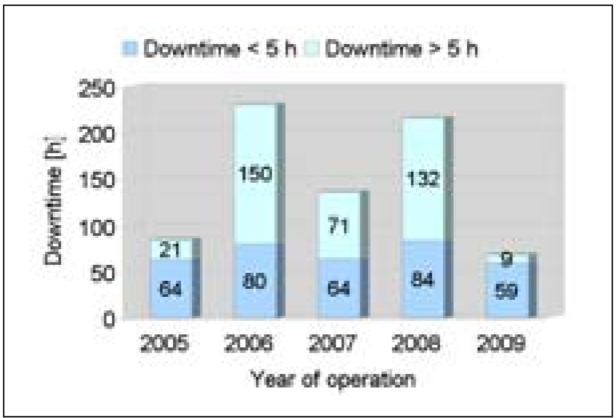


Figure 7: **Total downtimes for long and short events.**

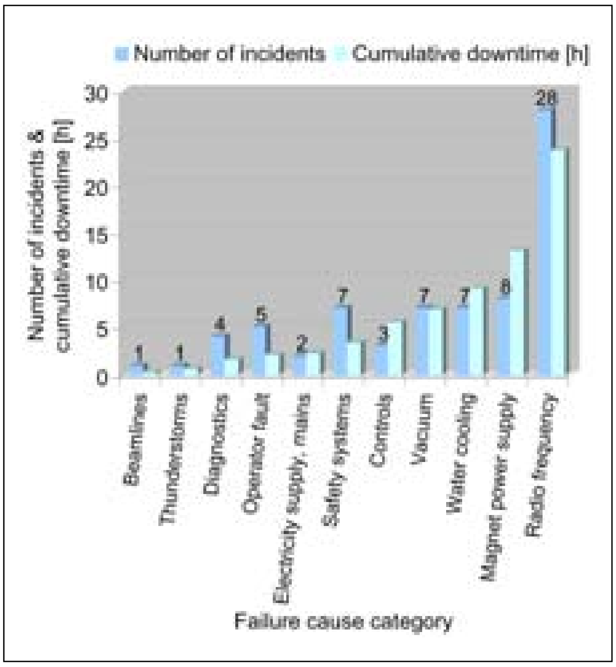


Figure 8: **Downtime per failure category in 2009.**

Not only beam outages are disturbing operation. Failure of the injector or a deviation from the desired beam parameters, such as the beam lifetime or beam size, can significantly affect the quality of experimental conditions. In order to enable efficient and thorough investigation of such beam distortions, we have developed an operation event logging system [1]. An event is defined by start and stop rules. The relevant information related to the event, such as archived beam data, related entries in the shift logbook or lists of alarms, are automatically collected to support quick and comprehensive investigation of the circumstances that led to the disruption of operation. Several types of events are currently defined: downtime, beam-drops, bad beam lifetime and expansion of the vertical beam size. Each event will be assigned to a failure category after its causes have been identified. Figure 8 shows downtime events in 2009 assigned to different failure categories.

Beam-time statistics	**2009**		**2008**	
Total beam time	6704 h	76.5%	6824 h	77.7%
• user operation	5007 h	57.1%	5160 h	58.7%
– incl. compensation time	144 h	1.6%	144 h	1.6%
• beamline commissioning	896 h	10.2%	848 h	9.7%
• setup + beam development	800 h	9.1%	816 h	9.3%
Shutdown	2064 h	23.6%	1968 h	22.4%
User operation downtimes	68		78	
• unscheduled outage duration	66 h	1.3%	218 h	4.2%
• injector outage (non top-up)	14 h	0.3%	23 h	0.5%
Total beam integral	2460 Ah		2448 Ah	
Availability	98.7%		95.8%	
Availability after Compensation	101.6%		98.5%	
MTBF	72.6 h		65.3 h	
MTTR (mean time to recover)	1.0 h		2.8 h	

Table 2: **SLS operation statistics.**

The event logging system proved to be very useful for analyzing the most frequent causes of beam distortion and is a dependable source of information for upgrade and maintenance planning. One measure that is currently in process is the prevention of false arc interlocks in the RF system. About 20% of all beam outages are caused by arc interlocks, and a large fraction of these are suspected to be avoidable. The installation of coincidence arc detectors will help to reduce such interlocks.

The materials science beamline will be equipped with a new insertion device in 2010. A cryo-cooled permanent magnet undulator (CPMU) will replace the last wiggler in the SLS. The new undulator will generate photons up to 30 keV at a gap of 3.5 mm. We will install a new aperture-limiting scraper in order to protect the insertion devices with these extremely small gaps. The scraper will be installed in the injection straight, far away from the next beamline. In this way, the loss of halo-electrons with large vertical displacements will be localized without affecting user instruments. A new mode of operation was developed in 2009: the low-alpha mode [2], which allows the generation of electron pulses shorter than 10 picoseconds. The X-rays generated by these electron pulses can be used for time-resolved measurements. This mode will be offered for pilot experiments in 2010.

References

[1] A. Lüdeke, *The Operation Event Logging System of the Swiss Light Source,* Phys. Rev. ST Accel. Beams **12** 024701 (2009).

[2] N. Milas, A. Streun, M. Böge, *Low Alpha Operation of the SLS,* this report.

The Swiss Light Source in 2009: Finishing the build-up and pushing the science

Stefan Müller, Clemens Schulze-Briese, Christoph Quitmann, J. Friso van der Veen, *SLS, PSI*

The inauguration of the NanoXAS beamline in November 2009 rang the bell for the final round of beamline building at SLS. Achieving excellent scientific results using the existing beamlines will be the predominant task for the future. The quality of the existing instrumentation is proven by yet another increase in the number of users and many high-impact publications, the most prominent of which is the contribution of the PX beamlines to the Nobel Prize-winning work of V. Ramakrishnan. Public outreach activities of SLS included successful international conferences and workshops, as well as the PSI summer school and the Joint Users' Meeting.

New record – more proposals than ever before

The past year showed a significant increase in the number of proposals, reaching 724. More than 1500 individual users carried out a total of 1053 experiments, visiting the facility on average twice per year. Figure 1 shows the number of proposals submitted since SLS started regular user operation in 2002. Overbooking for ADRESS and PX-I increased from 1.7 to 3.4 and from 6.5 to 8.7, respectively.
At PX, we encourage users to request beam time on both public beamlines in order to carry out the bulk of the screening at the high-throughput beamline X06DA and high-resolution data collection at the high-performance beamline X06SA.

Industrial use – protein crystallography and more

Almost 200 out of 1800 experimental days were used by private companies. The boom in industrial protein crystallography continues, with 80% of the industrial experiments at SLS carried out at the PX beamlines by companies such as Roche,

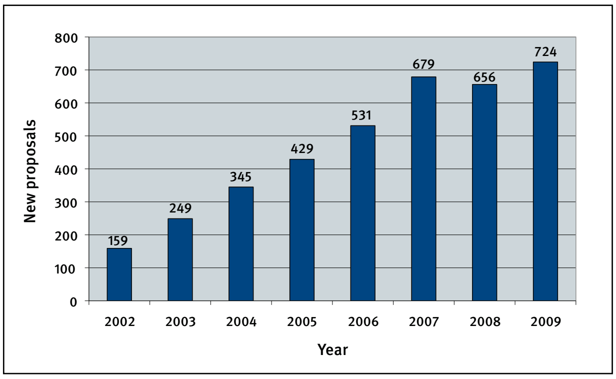


Figure 1: **Number of submitted proposals in the years 2002–2009.**

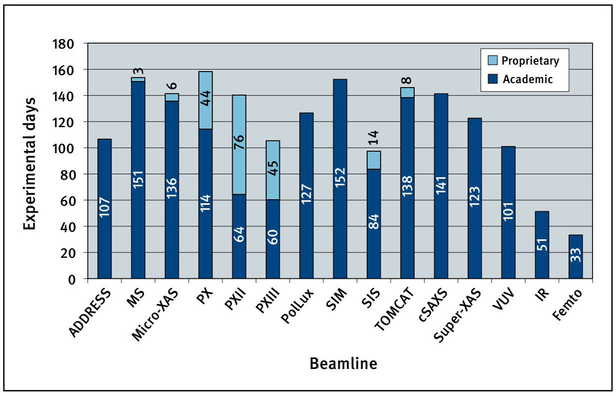


Figure 2: **2009 distribution of the SLS experimental days between proprietary and academic research.**

Novartis and Böhringer (Figure 2). This high demand triggered the founding of the service crystallography company Expose as a PSI spin-off. The other 20% was dedicated to X-ray lithography, powder diffraction and tomography.

Open access for academic users

Access for academic researchers from EU member and associated states is supported through the European integrated infrastructure project ELISA. In 2009, 50 % of beam time was given to academic users from EU countries, proof of the facility's international visibility.

Committees – evolving to follow challenges

Because of the advent of SwissFEL, the SLS Scientific Advisory Committee (SAC) was augmented by FEL specialists, forming the new Photon Science Advisory Committee (PSAC). This is headed by Prof. Dr. Gerhard Materlik (Diamond Light Source) and will advise PSI on strategy for the SLS and SwissFEL, and their collaboration. The two Proposal Review Committees (PRC) evaluated in total 724 proposals. The non-PX and PX committees are chaired by Prof. Ph. Aebi (Univ. Fribourg, Switzerland) and Prof. Dr. Nenad Ban (ETH Zurich), respectively.

Building the final beamlines and upgrading the first

A highlight of the year was the inauguration of the new NanoXAS beamline, which combines scanning X-ray transmission microscopy (STXM) with in-situ scanning probe microscopy (SPM), enabling spatially resolved X-ray spectroscopy studies of modern nano-materials. The goal is to push the resolution limit well below 10 nm. The NanoXAS beamline was built in collaboration with EMPA and the University of Erlangen-Nürnberg and was jointly financed by Swiss and German agencies.

Two new beamlines, Phoenix and X-Treme, will be operational in the second half of 2010. Both beamlines are for X-ray absorption spectroscopy, with Phoenix focusing on environmental and materials research and X-Treme on dichroic studies with a high-intensity magnetic field and at low temperature.

A dedicated beamline (XIL-II) was built for the successful X-ray Interference Lithography project, thus providing seven times more beam time than before. In addition, the new XIL-II beamline will provide shorter wavelengths, variable illumination angles and controlled harmonic rejection. It provides periodic lithographic structures for academic users and will be used by industry as a test bed for state-of-the-art lithography.

A start has been made on the construction of the last SLS beamline, PEARL, which is expected to become operational in 2011.

New structure of SLS activities

During the construction of the synchrotron facility, the focus of facility activities was the development of outstanding instrumentation. Now that the facility offers a full range of synchrotron radiation applications to its users, the focus has shifted towards the thematic scope of in-house research and scientific cooperation with our users. As part of this change, the structure of the Synchrotron Radiation and Nanotechnology Department (SYN) was redefined. The operation of the beamlines at the SLS is split into three thematic areas: macromolecules and bio-imaging (LSB), condensed matter (LSC), and energy and environment (LSE). These three laboratories are responsible for the beamlines, user support and an in-house research programme in their respective areas. The fourth laboratory in the SYN Department performs research in micro- and nanotechnology (LMN). LMN operates the XIL-II beamline for X-ray Interference Lithography, enabling the production of large-area periodic nanostructures for a diversity of applications in magnetism research, optics and sensorics.

Outreach – hands-on experience and combined users' meeting

For the first time, the annual PSI Summer School on Condensed Matter Research at the Lyceum Alpinum in Zuoz was followed by a two-day lab course at PSI. During the lab course, students could gain hands-on experience when running an experiment at the SLS, SμS or SINQ. The title of the school was "Functional Materials". Experts explained the need for functional materials and the potential of research using large facilities in areas such as energy storage and conversion systems, biocompatible materials, superconductivity, as well as industrial catalysis. The School brought together 96 participants, with 14 different nationalities and affiliations [Swiss (66), EU (27) and others (3)].

The users' meeting was successfully held in a new format combining all large-scale facilities (SINQ, SLS and SμS) and involving the newly founded Joint Users' Association of PSI (JUSAP) to select workshop topics. It attracted more than 220 scientists.

Highlights

It is a great honour for us that our long-term user of the protein crystallography beamlines, Dr. Venkatraman Ramakrishnan from the MRC Laboratory of Molecular Biology at Cambridge, UK, was awarded the 2009 Nobel Prize in Chemistry for the structure and function of the ribosome (with Ada Yonath and Thomas Steitz).

The reports presented in the 'Research focus and highlights' section of this report represent only a small selection from many results achieved at SLS. In 2009, a remarkably high number of user publications (41 in total) appeared in the leading journals Science, Nature, Cell and Phys. Rev. Letters. This illustrates the excellence of our user community and our in-house staff.

We thank all our users for the excellent science they have brought to the SLS in 2009.

Swiss Spallation Neutron Source, SINQ, 2009: New records and a silver jubilee

Stefan Janssen, Kurt N. Clausen, *NUM Department – Research with Neutrons and Muons, PSI*

The year 2009 was in many ways an outstanding one for the Swiss Spallation Neutron Source SINQ. The integrated proton current passed the 6000 mAh mark for the first time and its associated high availability resulted in more than 480 experiments being performed on SINQ instruments. It was also the year of the 25th anniversary of the Laboratory for Neutron Scattering, a highly successful joint venture between PSI and ETH Zurich. Finally, during the last few operating days of December, the first proton beam was delivered to our new Ultracold Neutron target station, UCN.

New records …

Thanks to the proton accelerator again performing very reliably – for three years in a row, the availability of the accelerator has been at or over 90% – and thanks to the stable and reliable performance of SINQ target operation, more than 6000 mAh of total charge were received by the SINQ target (6218 mAh) for the very first time, so that the previous record from 2005 was exceeded by 7%! The new solid-target generation "7", with Pb in Zirkaloy tubes and a Pb blanket, provided a gain factor in neutron flux of 2.2 compared with the generation "1" target, and thus almost reached the level of the MEGAPIE liquid metal target (factor of 2.6). SINQ itself provided an availability of 99.3% relative to the delivered proton beam.

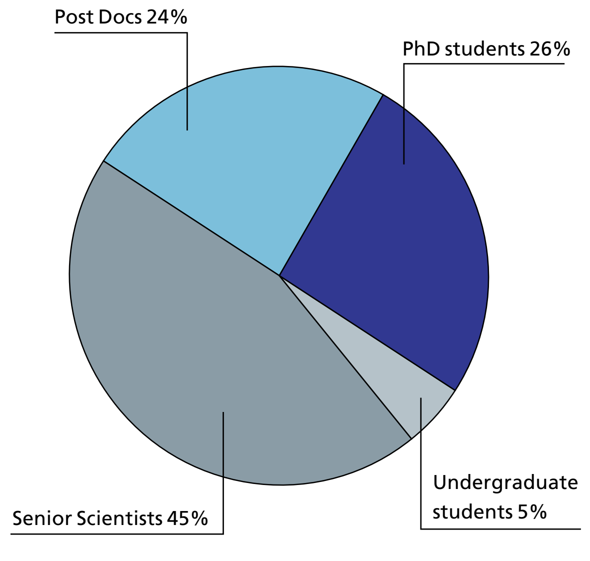


Figure 1: **Career status distribution of SINQ users 2009.**

This outstanding reliability provided the basis for successful SINQ user operation and makes SINQ one of the most attractive neutron sources in Europe. In 2009, 488 experiments were performed on the 13 SINQ instruments, over a total of 2105 instrument days. For the first time, more than 700 user visits were recorded and over 400 different scientists came to perform experiments at the Swiss spallation source.
Fifty-one percent of beam time in 2009 was used by Swiss groups, followed by groups from Germany (8%), Denmark and the United Kingdom (both 6%) and France (5%). In total, SINQ was used by groups from 27 different countries. As can be seen from Figure 1, SINQ also played an essential role in the scientific education of future neutron scattering scientists. 55% of users in 2009 were in the undergraduate, doctoral or Postdoc phases of their careers.
In 2009, another 323 proposals were submitted requesting SINQ beam time. That exceptionally large number illustrates very clearly the interest of the international user community in SINQ for the future.

… and a silver jubilee

On 1 October 1984, the Laboratory for Neutron Scattering (LNS) was founded as a joint venture between a predecessor of the Paul Scherrer Institute (the EIR) and ETH Zurich. Since then, 25 years full of scientific activities have passed, with more than 1700 publications, and LNS celebrated its silver jubilee in 2009. From 1984 to 2004, Prof. Albert Furrer was the head of LNS, and under his direction major milestones were reached and a neutron-scattering programme with several instruments was carried out at the 10 MW SAPHIR reactor. In 1988, LNS was strongly involved in establishing Swiss participation at the

ILL/Grenoble, which became even more important after the shutdown of the SAPHIR reactor in 1993, after which no Swiss neutron source was available. From 1993 onwards, LNS was also strongly involved in organizing the annual, and nowadays traditional, 'PSI Summer Schools on Neutron Scattering' in Zuoz (since 2002, this school has turned into a more general one on 'Condensed Matter Research'). LNS then played a major role in the project to realize the spallation neutron source SINQ at the PSI proton accelerator. The major tasks here were the conceptual design and the construction and realization of the neutron guide system and most of the neutron scattering instruments.

After the first SINQ neutrons had been delivered in December 1996, the tasks of the Laboratory shifted more and more from the construction of new instruments to their operation, with many hundreds of users per year. Of course, the delicate balance between user service and in-house research was, and still is, a major challenge for the Laboratory, but is being impressively met, as is demonstrated by the approximately 100–120 LNS publications per year.

After the retirement of Albert Furrer at the end of 2004, Joël Mesot became the new head of LNS and directed the Laboratory until July 2008, when he became director of PSI. Jürg Schefer then led LNS ad interim for one year, before the new head, Andrey Zheludev, was appointed in August 2009, with the task of continuing the LNS success story and guiding the laboratory into its second quarter-century.

The first joint user meeting at PSI: JUM@P

On 12–13 October 2009, for the very first time a joint user meeting was held for the three major user facilities at PSI, namely the Swiss Light Source (SLS), the Swiss Spallation Neutron Source (SINQ) and the Swiss Muon Source (SμS).

This Joint Users' Meeting, called JUM@P '09, was organized by PSI and its Users' Association, 'JUSAP'. The meeting aimed at bringing together the three user communities and generating new synergies among scientists, driven by common scientific, rather than technical, interests.

Not only the scope of the meeting was new, there was also a novel approach to defining the scientific programme. The organizers proposed certain scientific symposia and let the user community vote on them. Driven by the result, a total of six workshops were then selected by the organizing committee, ranging from 'Correlated Electron Systems' to 'Protein Crystallography'.

A plenary session with invited presentations, two poster sessions, a conference dinner and visits to the PSI facilities completed the meeting. The scientific programme is still online and can be seen at: http://user.web.psi.ch/jump09

Figure 2: **Florian Piegsa (left) receives the first PSI Thesis Medal from Prof. J. Friso van der Veen.**

Finally, the PSI Thesis Medal was awarded for the first time. This prize will be awarded biennially for an outstanding PhD thesis that contains significant results obtained at one or more of the PSI user facilities, and consists of a medal, a certificate and prize money. This year, the prize was awarded to Florian Piegsa (currently working as a Post Doc at ILL Grenoble, France) for his work on 'Neutron spin precession in samples of polarized nuclei and neutron spin phase imaging'.

JUM@P '09 was attended by more than 200 people from the three user communities. Fifty-one talks were given and almost 100 posters presented. After the successful start of the JUM@P series, it is envisaged establishing this new format of PSI user meetings every two years.

SμS 2009: Swiss Muons made at PSI

Elvezio Morenzoni, Stefan Janssen,
NUM Department – Research with Neutrons and Muons, PSI

Swiss Muons for the international user community: The new record of 178 submitted proposals in 2009 very impressively demonstrates the strong interest there is in the facility, and the availability of a new and unique instrument during the coming years will ensure the attractiveness of the facility in the future.

SμS User Laboratory

The Swiss Muon Source, SμS, at PSI and the pulsed muon facilities at ISIS in the UK are the only muon sources in Europe. SμS, however, provides unique research capabilities, with its very high-intensity continuous muon beams and state-of-the-art instrumentation. Its uniqueness was reflected in 2009 by an outstanding number of publications based on research performed at the facility. A total of 109 papers appeared, including publications in journals with high impact factor, such as Nature (1), Nature Materials (3), the Journal of the American Chemical Society (2) and Physical Review Letters (10). Thanks to the excellent and reliable performance of the PSI proton accelerator and beamlines, almost 190 experiments were able to be performed on the six instruments, in approximately 700 experiment-days.

The facility is used by Swiss groups from PSI and the universities (43%), with a comparable share from foreign European groups: 39% of the available beam time was used by groups from neighbouring European countries, such as the United Kingdom (14%) and Germany (13%). Additionally, 18% of beam time was allocated to groups from Japan (10%), the United States (3%), and Canada and Russia (both 2%). Beam time was used by almost 150 different scientists during more than 340 visits to PSI.

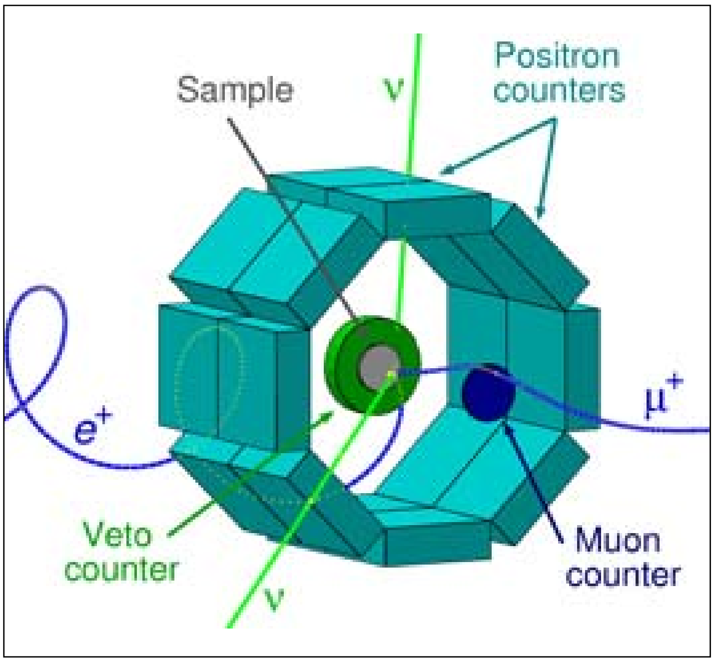


Figure 1: **Sketch of the sample region of the high-field instrument. To achieve good positron detection efficiency, the spectrometer must be very compact and operate with time resolution at or below 100 ps, at the highest field strength. This is achieved by a special design based on avalanche photodiode detectors.**

Towards a new, unique instrument

A user laboratory such as LMU has always to keep the right balance between leading-edge scientific research, user operation and the development of new instruments and tools to cope with future challenges. In this respect, 2009 was also very successful, because a proposal to build a new instrument for muon spin spectroscopy research in high magnetic fields (up to 10T) and at low temperatures (20 mK) (Figure1) was approved and granted high priority within PSI's strategic plan. This is very encouraging and important news, since the realization of this very challenging project will provide SμS with another unique instrument for detailed investigation of the microscopic properties of unconventional superconductors, low-dimensional magnetic systems, heavy fermions and many other similar systems.

The Ultracold Neutron Source: First beam on target

Werner Wagner, Bertrand Blau, Knud Thomsen, Bernhard Lauss, Klaus Kirch
NUM Department, ASQ and LTP, PSI, on behalf of the PSI UCN project team

Ultracold neutrons (UCN) are used in precision tests of the Standard Model of Particle Physics. In December 2009, the PSI Ultracold Neutron (UCN) Source received the first proton beam on the spallation target. The beam was delivered in a well-elaborated sequence of 5 ms pulses, from 100µA up to a full beam current of 2 mA. This test run successfully confirmed the beamline and system integrity for beam-on operation and neutron production. The installation will be completed with the cold source in spring 2010.

The PSI UCN source is a new type of ultracold neutron source based on neutron production via spallation and subsequent separated neutron storage. It is driven by the full 590 MeV proton beam from the PSI ring cyclotron (I_p > 2mA), using several-seconds-long pulses at a 1% duty cycle. A lead/zircaloy cannelloni spallation target is used for neutron production. The proton beamline up to the target was successfully tested in December 2009 and first neutrons were produced and observed (Figure 1). A large D_2O moderator, a solid deuterium (sD_2) converter, a storage volume and the UCN-delivering neutron guides are the main system components. The UCN density delivered to experiments is expected to be about 1000 UCN/cm^3, an increase of almost two orders of magnitude over the present best source (at ILL).

The core of the source is the technically most challenging component, the sD_2 crystal container, where neutrons are down-scattered to become ultracold. This vessel will contain 30 litres of solid D_2 at 5 K, cooled by supercritical helium circulating in a multi-channel labyrinth through the side wall and bottom plate. UCN can leave the sD_2 upwards via the vertical guide to the UCN storage volume. This volume of about 2m^3 (Figure 2) should store as many UCNs as feasible for periods as long as possible. The special UCN-preserving coating on the inside of the volume is made from diamond-like carbon. The technical challenge was to produce and coat the large wall and bottom pieces and assemble the volume with minimal gaps, in order to avoid losing stored ultracold neutrons.

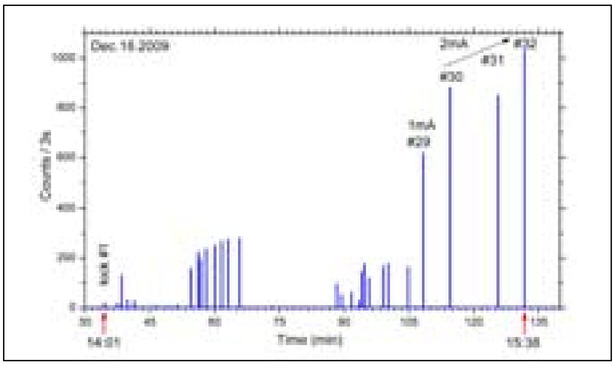


Figure 1: **Observed neutron counts in the experimental West area during beam testing. Neutron counts peaked at times, unambiguously matching proton beam kicks. The detected neutron intensities were found to depend on proton beam current and tuning.**

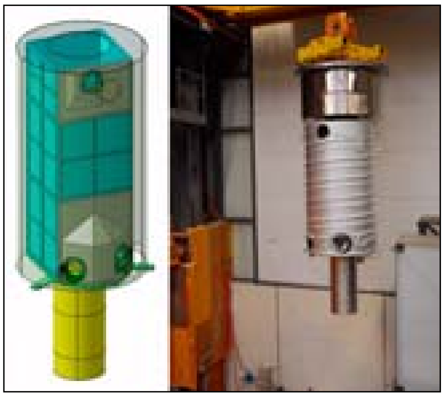
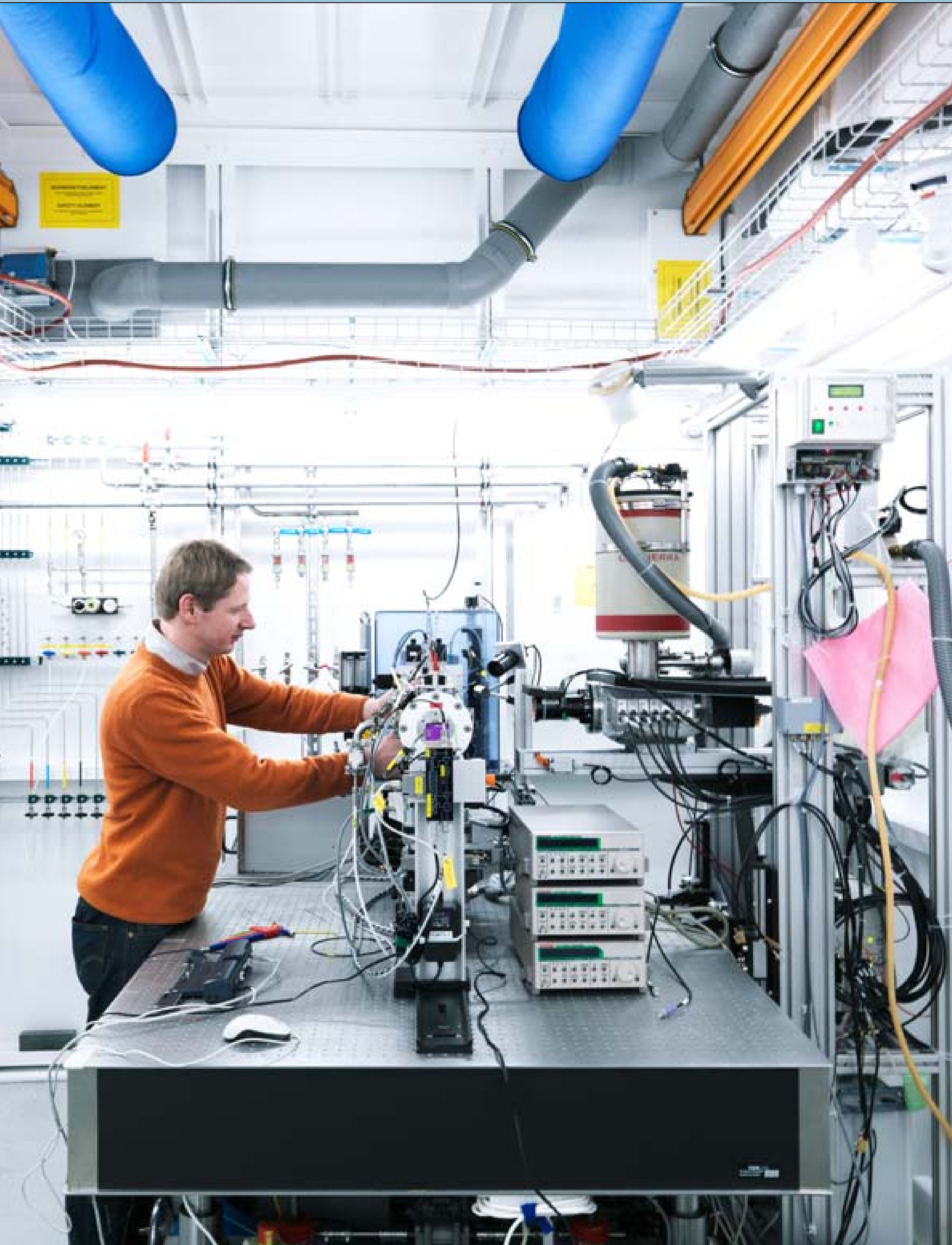


Figure 2: **Finished setup of the UCN storage volume surrounded by the heat radiation shield, vertical UCN guide on the bottom and ~10 tons steel shielding on top (about 5m tall):**
a) design drawing,
b) during transport to its final position in the UCN tank.

Installation and commissioning of the cryogenic system, including the sD_2 vessel, and the commissioning of the full source, including storage volume and all neutron guides, are the main activities up to the envisaged completion date in summer 2010. This should be in time for the scheduled restart of the cyclotron after its winter shutdown.

The UCN source will serve two experimental areas. In the South area, the experiment to search for the electric dipole moment of the neutron (nEDM) has been installed. The nEDM collaboration is already pursuing an extensive offline measurement programme and will be ready to detect the first ultracold neutrons delivered.



Technology transfer 101

102 Overview, projects in protein crystallography and energy technology

The design and construction of the large research facilities at the Paul Scherrer Institute constantly require new and innovative solutions at the cutting-edge of current technologies. Both scientists and engineers at the Institute are successfully pushing the limits in various technological fields, from power electronics to precision machining to nanotechnology. Alongside achievements in the various research fields being investigated at PSI, these accomplishments offer outstanding opportunities for commercialization by industrial partners.

The Technology Transfer office at PSI is ready to assist representatives from industry in their search for opportunities and sources of innovation at PSI, or to prepare the way for solutions to their own technological challenges.

The following pages present some promising technologies still to be discovered by our industrial partners.

◄ **PSI researcher Marteen Nachtegaal preparing an investigation of catalyst material at the SLS.**

Technology Transfer: At the gateway between research and industry

Robert Rudolph, *Technology Transfer Office, PSI;* Rouven Bingel-Erlenmayer, Vincent Olieric, Meitian Wang, Roman Schneider, Claude Pradervand, Wayne Glettig, Takashi Tomizaki, Ezequiel Panepucci, Vincent Thominet, Jörg Schneider, Andreas Isenegger, Clemens Schulze-Briese, *Swiss Light Source SLS, PSI;* José Gabadinho, Xiaoqiang Wang, *GFA Department, PSI;* Yohannes Ghermay, Joannis Mantzaras, Rolf Bombach, *Combustion Research Laboratory, PSI*

The mission of the Technology Transfer office is to facilitate the transfer of inventions and technologies generated by PSI's broad research activities from the laboratory to industrial applications. Such transfer activity aims to increase the competiveness of PSI's industrial partners in their markets by offering innovations for new products and processes, or opportunities for further developments and improvements. If this economic impact consequently creates new employment and new products that advance everyday lives, the society supporting our Institute benefits from the exploitation of our scientific work.

Technology-transfer projects rely on the quality of the relationships between the persons involved in different aspects with both partners. A major factor shaping these relationships is the layout of the contractual framework and collaboration concept which is adopted for each transfer project. The greatest task within these boundary conditions is the alignment of the needs and expectations of the industrial and scientific partners.

The most effective way of transferring competencies in technologies and know-how is to "transfer" people, who not only take along additional intangible knowledge to the company but also the enthusiasm to transform their research into industry-standard applications. PSI has experienced the successful "person transfer" of both PhD graduates and senior scientists.

A very useful way of supporting industrial research and development is to make available the instruments and methods used at our large research facilities. As a user lab, PSI develops and operates instruments and equipment for a wide range of applications, from material and structure analysis to imaging. The services offered by PSI include the evaluation of the appropriate measurement configuration, support with data acquisition and expertise in data analysis. The following section showcases a new opportunity for combining the crystallography capacities at the Swiss Light Source SLS with new equipment for crystallization.

From the economic point of view, the most significant model of technology transfer is projects involving intellectual property rights (IPR) generated at PSI. If it is the granting of rights to use PSI-owned IPR or the transfer of patents, the industrial partner expects a direct economic advantage from applying such protected IPR in itsproducts and is ready to compensate PSI for this advantage.

Research collaborations offer companies the opportunity to tap PSI's know-how and technologies early in the innovation process. Depending on the technological situation and requirement, a collaboration framework will be set up that equally matches the interests of the industrial partner and PSI. An agreement which includes the project plan, provisions on intellectual property and confidentiality is the basis for such collaboration. A public-funded collaboration project in the General Energy Department has been concluded in 2009 with Alstom Power (see article on page 64).

If you are interested in one of the technology transfer models described above, or if you are looking for advice or consultation on a specific topic, the Technology Transfer office is ready to connect you with the matching competencies at PSI.

A beamline-integrated crystallization platform enabling automated *in situ* diffraction screening

The structural genomics era has promoted high throughput and automation methods in the crystal structure determination process. However, generating macromolecular crystals suitable for structure solution remains a time-consuming, iterative trial-and-error process. First crystals appearing under initial, non-optimized crystallization conditions have to be

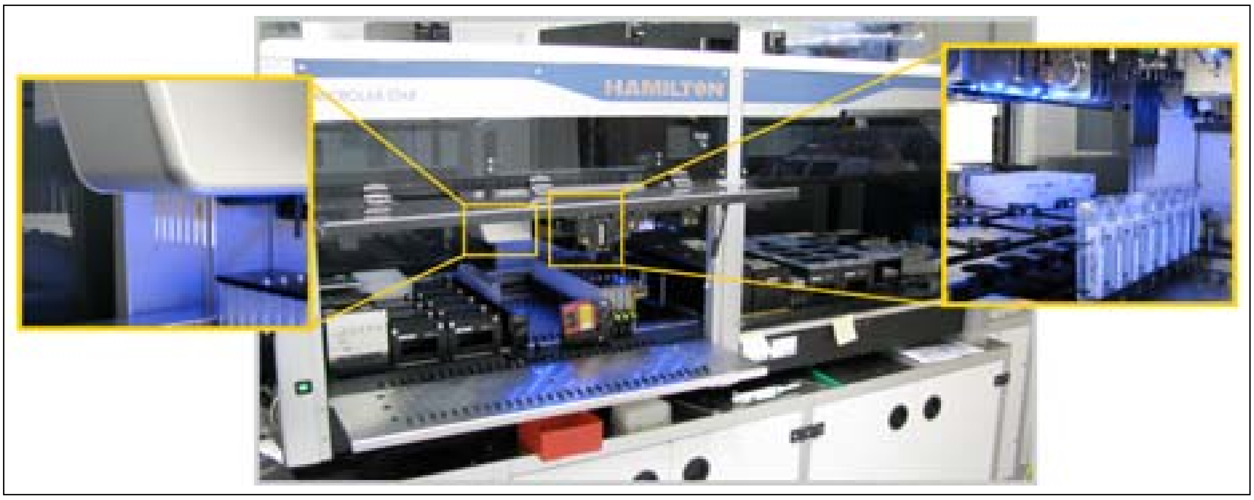


Figure 1: **Liquid-handling robot of the crystallization facility. The platform can carry out all steps of the workflow necessary to set up crystallization experiments in the nanolitre scale.**

evaluated in the X-ray beam for their diffraction properties, and often they only yield low-resolution data of insufficient quality to determine the crystal structure. Only after these initial diffraction experiments can scientists start to optimize the crystallization conditions which ultimately should lead to the solution of the structure of the macromolecule.

In order to reduce the time required for this iterative cycle, the SLS team has built a protein crystallization platform which is directly integrated with the protein crystallography beamline X06DA. This crystallization platform is open to both academic and industrial users. The setup allows users to send their purified protein sample and request crystallization experiments carried out by nano-dispensing liquid-handling robots (Figure 1). Utilizing a web interface, the individual crystallization experiments, which are stored in an automated imaging system, can be visualized and evaluated remotely. Moreover, the unique integration of a crystallization platform with a beamline will enable users to screen initial crystals in an automated manner in situ, i.e. in the crystallization container, for their X-ray diffraction behaviour (Figure 2).

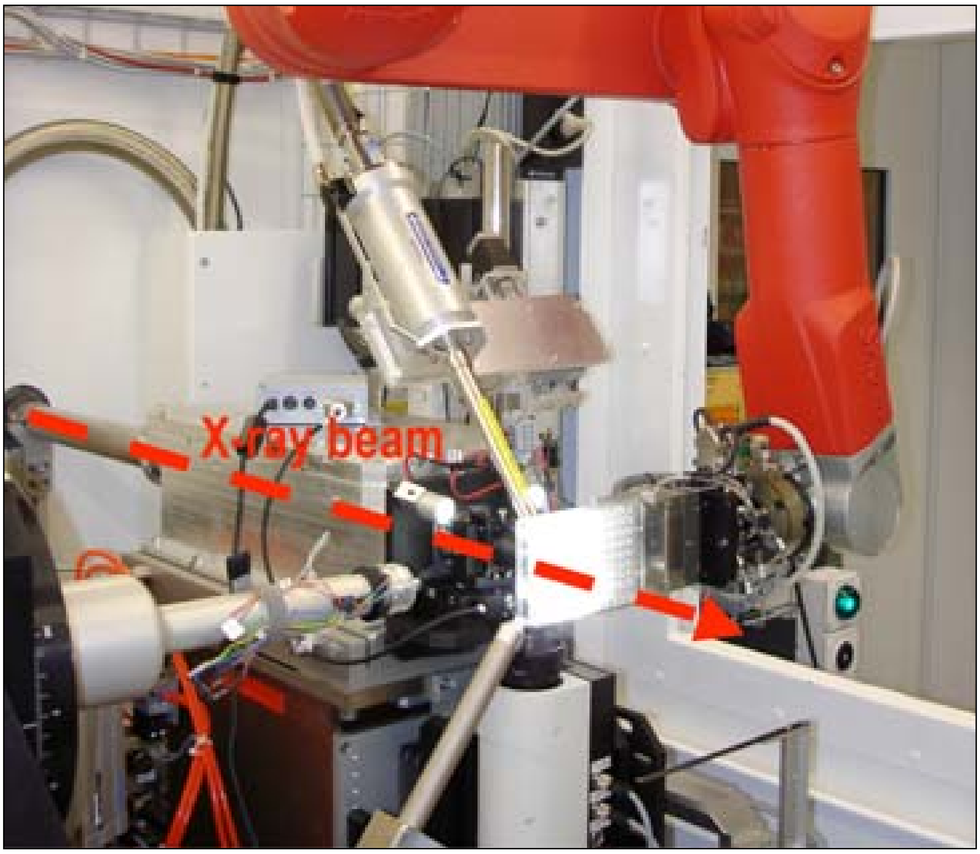


Figure 2: **Sample-changing robot equipped with a gripper holding a crystallization plate into the X-ray beam at the X06DA beamline.**

Therefore, the novel layout designed by the SLS team gives users rapid feedback on important crystal parameters, such as the diffraction limit, anisotropy, cell parameters, and mosaicity. In addition, users avoid any manipulation of the crystal usually applied when freezing it in liquid nitrogen, which is often a source of harmful treatment. The results of the in situ X-ray diffraction screening will guide the users in planning and prioritizing the optimization of the crystallization experiments. The optimization steps can also be carried out at the SLS crystallization platform.

Combustion of hydrogen-rich fuels for gas turbine applications

Syngas, consisting mainly of CO and H_2, can be produced from a variety of sources, including biomass and coal, and has recently attracted increased interest for enhancing fuel supply security and flexibility in power generation [1]. Moreover, syngas fuels are better suited for subsequent carbon capture and sequestration (CCS) strategies in large power plants. Within an ongoing collaboration with Alstom Power of Switzerland (KTI and CCEM funded projects), the ignition characteristics of pure hydrogen and syngas mixtures have been investigated in catalytic channel-flow configurations.
In a first study, the impact of fractional hydrogen pre-conversion on the subsequent homogeneous ignition of fuel-lean (equivalence ratio $\varphi = 0.30$) H_2/air mixtures over platinum has been investigated experimentally and numerically at pressures up to 8 bar. Fractional fuel pre-conversion is of interest for Alstom's gas turbines, which employ sequential combustion technology. Pre-conversion results in reduced fuel and increased temperatures for the ensuing reactive mixture and also furnishes main combustion products and radicals over the gaseous induction zone.
Experiments have been performed in an optically accessible channel-flow catalytic reactor and involved planar laser-induced fluorescence (LIF) of the OH radical for the assessment of homogeneous ignition. Hydrogen pre-conversion was achieved via a dedicated catalytic honeycomb reactor positioned upstream of the main optically accessible reactor. Simulations were carried out with a 2D numerical code that included elementary heterogeneous and homogeneous chemical reaction schemes [2, 3]. For 0% pre-conversion and catalyst surface temperatures in the range $900\ K \leq T \leq 1100\ K$, homogeneous ignition was largely suppressed for $p \geq 5$ bar, due to the combined effects of intrinsic gas-phase hydrogen kinetics and the competition between the catalytic and gas-phase pathways for fuel consumption. However, a moderate increase of hydrogen pre-conversion to 30%, with the ensuing preheat of the reactive mixture, restored homogeneous combustion for $p \geq 5$ bar (see Figure 3). It could be shown [4] that the re-establishment of gaseous combustion at elevated pressures with increasing pre-conversion was highly desirable, as it moderated the reactor surface temperatures.
In a second step, syngas combustion was investigated using the same experimental and numerical tools. Figure 4 provides comparisons between measured (a) and predicted (b) OH distributions for a specific syngas mixture at atmospheric

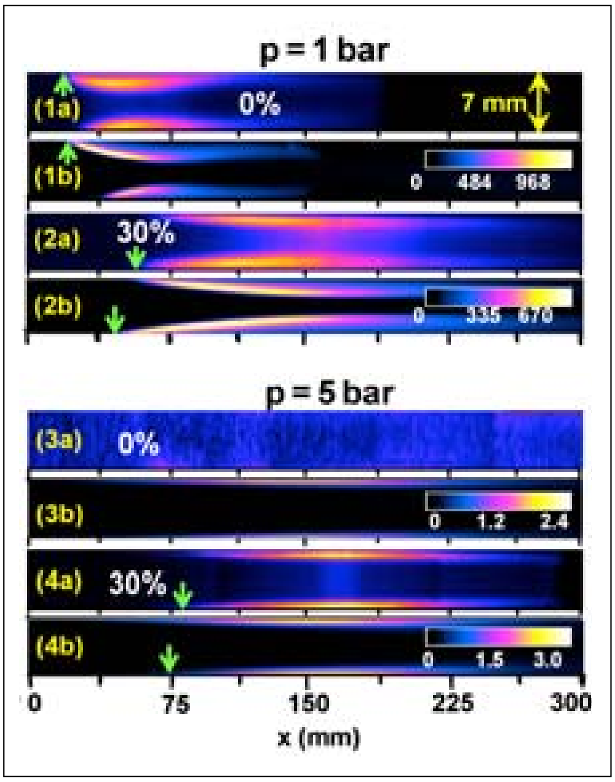


Figure 3: **LIF measured (a), and numerically predicted (b), distributions of the OH radical during fuel-lean (φ = 0.30) combustion of H_2/air in a Pt-coated channel reactor with length 300 mm and height 7 mm. Cases (1) and (3) refer to no hydrogen pre-conversion, while (2) and (4) to 30% hydrogen pre-conversion. The arrows indicate the onset of homogeneous ignition. The bars provide the OH levels in ppmv.**

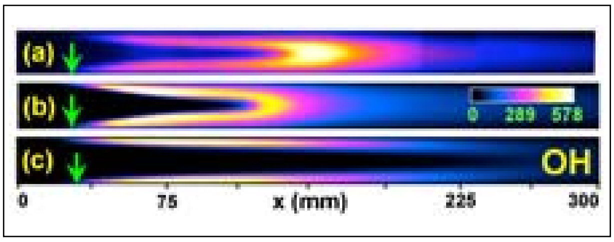


Figure 4: **LIF measured (a), and numerically predicted (b), distributions of the OH radical during fuel lean (φ = 0.33) combustion of syngas/air mixtures (CO:H_2 molar ratio of 2:1) at *p* = 1 bar, in the same reactor as Fig. 1. Plate (c) provides predictions when CO is replaced with inert N_2. The arrows indicate the onset of homogeneous ignition. The bar provides OH in ppmv.**

pressure. In Figure 4(c), the predictions were repeated by replacing CO with inert N2. Results indicate that, while the onset of homogeneous ignition is not influenced by the presence of CO, the flame length, and hence the required reactor length, is greatly reduced by the presence of CO (compare Figures 4b and 4c). The reason for this is that gas phase combustion of hydrogen (without CO) is confined close to the wall (see Figures 3 and 4c). The diffusionally neutral CO fuel combusts farther away from the wall, the ensuing heat release raises the channel core temperature, and this in turn supports gaseous H2 combustion away from the wall. The result is that gaseous conversion of H_2 can be accomplished with considerably shorter reactor lengths (Figure 4c) in the presence of CO – an important design aspect for practical reactors.

References

[1] H.M. Kvamsdal, K. Jordal, O. Bolland, Energy **32** 10-24 (2007).

[2] O. Deutschmann, L.I. Maier, U. Riedel, A.H. Stroemman, R. W. Dibble, Catal. Today **59** 141-150 (2000).

[3] J. Li, Z. Zhao, A. Kazakov, F.L. Dryer, Int. J. Chem. Kinet. **36** 566-575 (2004).

[4] Y. Ghermay, J. Mantzaras, R. Bombach, Combust. Flame, accepted, 2010.

Facts and figures

108 PSI in 2009 – an overview
110 Commission and committees
112 Organizational Structure

Good science needs good people. It needs those who do the science – PSI scientists as well as external users – and it needs the technicians and engineers who design, build and run the highly sophisticated scientific infrastructure. It also needs the administrative staff who make sure that all procedures run smoothly. Also, it needs people who take the decisions and plan the Institute's long-term development.

And good science needs money – in the case of the Paul Scherrer Institute, mostly provided by the Swiss Confederation.

The following pages give an overview of who the people are who work at PSI, how the Institute is organized and how the money it receives is distributed.

◀ **Frank Buchser (left) and Martin Leder in the central control room, from which all accelerators at PSI are operated.**

PSI in 2009 – an overview

Finances

The total expenditure of PSI in 2009 amounted to CHF 321.0 million, with the Swiss government providing 74.74 % of this amount, i.e. CHF 239.9 million. Investments totalled CHF 84.0 million (26.17 % of total expenditure). Third-party funding amounted to CHF 80.1 million, with 35.33 % coming from private industry, 19.48 % from Swiss federal research programmes and 10.11 % from EU programmes, while the Canton of Aargau made an additional contribution of CHF 10 million to the Proton Therapy facility.

PSI Financial Statement (in CHF millions)		
	2009	
Expenditure		
Operations *	237.0	73.83 %
Investments *	84.0	26.17 %
Total	**321.0**	**100 %**
Expenditure according to source of income		
Federal government funding	239.9	74.74 %
Third-party	81.1	25.26 %
Third-party revenue		
Private industry	28.3	35.33 %
Federal research funding	15.6	19.48 %
EU programmes	8.1	10.11 %
Support by the Canton of Aargau for Proton Therapy	10.0	12.48 %
Other	18.1	22.60 %
Total	**80.1**	**100 %**

* Including personnel costs. Total personnel costs of CHF 201.2 million corresponded to 62.68% of total expenditure.

Table 1: **PSI finances in 2009.**

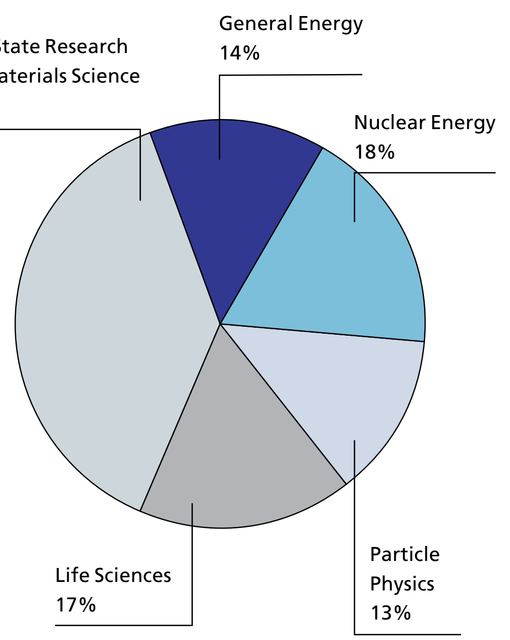


Figure 1: **Total budget distribution for 2009 across PSI Departments.** Research facilities allocated to the various departments.

Employment

At the end of 2009, employment at PSI corresponded to 1300 full-time equivalent staff positions, of which 463 were occupied by scientists, not including the 185 PhD students employed by the Institute. A further 749 positions were occupied by technicians and engineers, a relatively large number, reflecting the importance of technical staff for the successful operation of a large laboratory with its variety of scientific facilities. 91 positions were held by administrative staff. Of the total staff, 23.1% were women and 42 % were non-Swiss citizens.

Education

For the Paul Scherrer Institute, education is a central task. More than 300 graduate students from the ETH and other universities were working at PSI for their degree. Meanwhile, 80 young people were undergoing vocational training in 13 different professions. In addition, PSI offered courses in radiation protection and reactor technology for internal staff as well as external groups.
The school lab iLAB provides pupils from secondary schools with the opportunity to perform a variety of physics experiments and thus obtain an impression of scientific research. In 2009, iLAB hosted 105 such classes.
PSI scientists are also active as educators outside the Institute, with more than 80 of them giving courses at universities and universities of applied sciences.

User Service

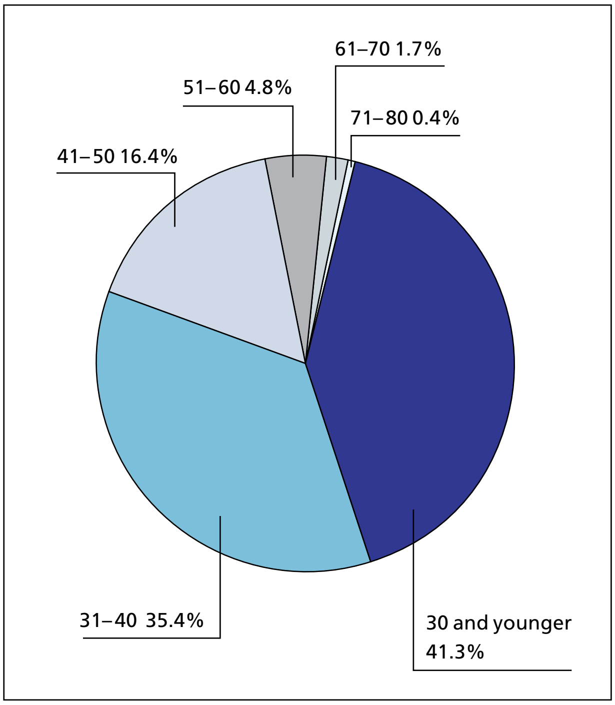
In 2009, PSI kept its position as an attractive User Lab for scientists from all over the world. More than 2100 users visited the Institute and performed more than 1700 experiments at the 39 beamlines available at the large-scale facilities. The high demand is reflected in the overbooking that occurred, with an average value of more than 2. However, for the protein crystallography beamline PXI, overbooking reached 8.7. The overall number of peer-reviewed publications based on research at PSI's large-scale facilities reached a new high, with 330 publications for SLS, 119 for SINQ and 79 for SμS. The User Service at the PSI large-scale facilities also makes an important contribution to the education of future generations of scientists. This is reflected in the large number of young scientists among the users.

User lab 2009						
	SLS	**SINQ**	**SμS**	**Particle physics**	**PSI total**	**(2008)**
No. of beam-lines/ instruments	15	13	6	5	**39**	(40)
No. of experiments	1053	488	188	5	**1734**	(1658)
No. of user visits	3145	789	342	250	**4526**	(3954)
No. of individual users	1518	406	148	150	**2168**	(2334)

Table 2: **PSI user service in numbers.**

Research Commission

The Research Commission of the Paul Scherrer Institute advises the Directorate on decisions related to the scientific research carried out at the Institute. It evaluates proposed new projects and applications for financial support from external agencies, assesses ongoing projects and helps define appropriate new research topics for the Institute. The Commission consists of 13 staff from the various departments of PSI. Once or twice a year, meetings of the Strategic Research Commission are held, which, in addition to the members of the Internal Research Commission, also includes 11 scientists of high scientific standing from Switzerland and abroad. This Commission's main task is to advise the Directorate on the development of long-term research programmes and to evaluate the quality of past and planned research activities.



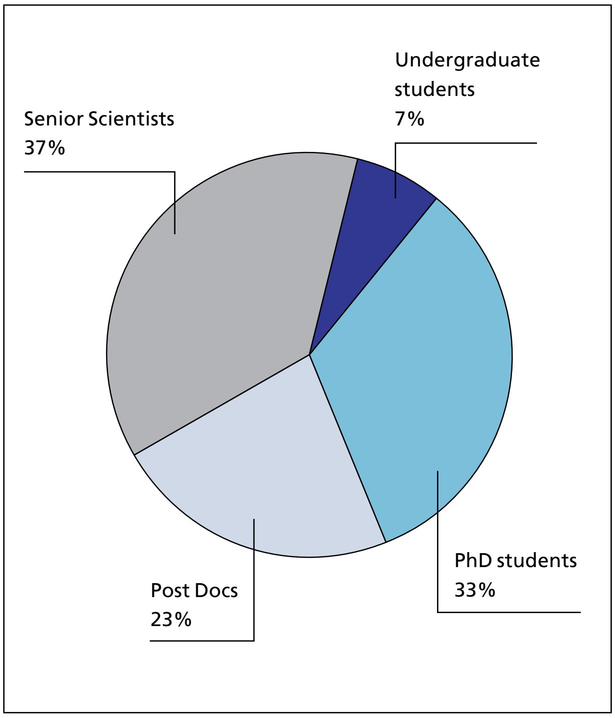


Figure 2: **Age distribution (upper chart) and career status (lower chart) of users at SINQ, SLS and SμS in 2009.** Most users at PSI's large-scale facilities are young people at the beginning of their scientific careers.

Commission and committees

Research Commission

External Members

Prof. Dr. Ø. Fischer, President	Department of Condensed Matter, University of Geneva, CH
Prof. Dr. G. Aeppli	London Centre for Nanotechnology, University College, London, UK
Prof. Dr. F. Carré	CEA, Gif-sur-Yvette, FR
Prof. Dr. H.H. Coenen	Institute for Nuclear Chemistry, Forschungszentrum Jülich, DE
Prof. Dr. R.W. Falcone	ALS, Lawrence Berkeley National Laboratory, Berkeley, USA
Prof. Dr. R. Klanner	Institute for Experimental Physics, University of Hamburg, DE
Prof. Dr. S. Larsen	Dept. of Chemistry, University of Copenhagen, DK
Prof. Dr. E. K. M. Leppävuori	VTT Technical Research Centre of Finland, FI
Prof. Dr. T. Mason	Oak Ridge National Laboratory, USA
Prof. Dr. J. Rossbach	Institute for Experimental Physics, University of Hamburg, DE
Prof. Dr. Th. Sattelmayer	Chair of Thermodynamics, TU München, Garching, DE

Internal Members

Prof. Dr. R. Horisberger, President	Research with Neutrons and Muons (NUM)
Dr. M. Ammann	Biology and Chemistry (BIO)
Dr. B. Delley	Research with Neutrons and Muons (NUM)
Dr. R. Eichler	Biology and Chemistry (BIO)
Dr. I. Mantzaras	General Energy (ENE)
Dr. W. Pfingsten	Nuclear Energy and Safety (NES)
Dr. T. Schietinger	Large Research Facilities (GFA)
Dr. C. Schulze-Briese	Synchrotron Radiation and Nanotechnology (SYN)
Dr. M Steinmetz	Biology and Chemistry (BIO)
Dr. U. Staub	Synchrotron Radiation and Nanotechnology (SYN)
Prof. Dr. H. Van Swygenhoven	Research with Neutrons and Muons (NUM)
Dr. F. Vogel	General Energy (ENE)
Dr. P. Hasler, Secretary	Biology and Chemistry (BIO)

Permanant Guest

Prof. Dr. N. Spencer	Department of Materials, ETH Zurich, CH

Research Committees

Synchrotron Radiation SYN

Scientific Advisory Committee (SAC)

Prof. Dr. G. Materlik, Chair
Diamond Light Source, Didcot, UK

Prof. Dr. T. Baer
University of North Carolina,
Chapel Hill, USA

Prof. Dr. H. Brune
EPFL, Lausanne, CH

Prof. Dr. R. Claessen
University of Würzburg, DE

Prof. Dr. K. Diederichs
University of Konstanz, DE

Prof. Dr. J. Evans
University of Southampton, UK

Dr. J. Feldhaus
DESY, Hamburg, DE

Prof. Dr. J. Hastings
Stanford Linear Accelerator Center,
Menlo Park, CA, USA

Prof. Dr. C.-C. Kao,
Brookhaven National Lab, USA

Dr. P. Lagarde
Synchrotron Soleil, Gif-sur-Yvette, FR

Prof. Dr. G. Margaritondo
EPFL, Lausanne, CH

Prof. Dr. F. Parmigiani
Free Electron Laser project-
FERMI@ElettraTrieste, IT

Prof. Dr. E. Rühl
Freie Universität Berlin, DE

Prof. Dr. L. Schlapbach
Swiss National Science Foundation SNSF,
Bern, CH

Prof. Dr. P. Schurtenberger
University of Fribourg, CH

Research with Neutrons and Muons NUM

SINQ Scientific Committee

Prof. Dr. A. T. Boothroyd, Chairman
University of Oxford, UK

Dr. M. Balasko
KFKI Atomic Energy Research Inst.,
Budapest, HU

Prof. Dr. Ch. Bernhard
University of Fribourg, CH

Dr. Th. J. Bücherl
TU München, DE

Prof. Dr. R. G. M. Caciuffo
Institute for Transuranium Elements,
Karlsruhe, DE

Prof. Dr. J. K. G. Dhont
Forschungszentrum Jülich, DE

Prof. Dr. J.-L. Garcia-Munoz
Inst. de Ciencia de Materials
de Barcelona-CSIC, ES

Dr. K. Krämer
University of Bern, CH

Prof. Dr. S. L. Lee
University of St. Andrews, UK

Prof. Dr. M. Müller
GKSS, Geesthacht, DE

Prof. Dr. B. Schönfeld
ETH Zurich, CH

PD Dr. A. Stradner
University of Fribourg, CH

Prof. Dr. W. Treimer
Beuth Hochschule für Technik Berlin, DE

Muon Spin Spectroscopy

Prof. Dr. H. Keller, President
University of Zurich, CH

Prof. Dr. E. Bauer
Vienna University of Technology, AT

Prof. Dr. S. J. Blundell
University of Oxford, UK

Prof. Dr. J.M.S. Campos Gil
University of Coimbra, PT

Prof. Dr. K. Chow
Univ. Alberta, CDN

Prof. Dr. R. De Renzi
University of Parma, IT

Prof. Dr. A. De Visser
University of Amsterdam, NL

Prof. Dr. Ph. Mendels
Univ. Paris XI, FR

Prof. Dr. D. Pavuna
EPFL, Lausanne, CH

Prof. Dr. J.-M. Triscone
University of Geneva, CH

Particle Physics at the Ring Cyclotron

Dr. C. Hoffman, President
LAMPF, Los Alamos, USA

Prof. Dr. A. B. Blondel
University of Geneva, CH

Dr. D. Bryman
TRIUMF, Vancouver, CDN

Dr. P. Cenci
I.N.F.N. sez. di Perugia, IT

Prof. Dr. G. Colangelo
University of Bern, CH

Prof. Dr. B. Filippone
California Institute of Technology, USA

Prof. Dr. St. Paul
TU München, DE

Prof. Dr. M. Pendlebury
University of Sussex, UK

Prof. Dr. M. Pohl
University of Geneva, CH

Prof. Dr. M. Ramsey-Musolf
University of Wisconsin-Madison, USA

Dr. R. Rosenfelder, committee secretary
PSI, CH

Prof. Dr. U. Straumann
University of Zurich, CH

Life Sciences BIO

Prof. Dr. D. Neri, President
ETH Zurich, CH

Prof. Dr. M. Grütter
University of Zurich, CH

Prof. Dr. Ch. W. Müller
EMBL, Heidelberg, DE

Prof. Dr. P. Nordlund
Karolinska Institutet, Stockholm, SE

Prof. Dr. S. Werner
ETH Zurich, CH

Nuclear Energy and Safety NES

Dr. Ch. McCombie, President
Gipf-Oberfrick, CH

Prof. Dr. M. Giot
Université Catholique de Louvin, BE

P. Hirt
Atel, Olten, CH

Dr. P. Miazza
Nuclear Power Plant Mühleberg, CH

Prof. Dr. K. L. Peddicord
Texas A&M University, College Station, USA

Dr. U. Schmoker
ENSI, Brugg, CH

Dr. J.-B. Thomas
CEA-Saclay, Gif-sur-Yvette, FR

Prof. Dr. S. Virtanen
University of Erlangen-Nürnberg, DE

Dr. P. Zuidema
Nagra, Wettingen, CH

General Energy ENE

Prof. Dr. T. Peter, President
ETH Zurich, CH

Prof. Dr. G.-L. Bona
Empa, Dübendorf, CH

Dr. T. Kaiser
ALSTOM (Schweiz), Baden, CH

Prof. Dr. H. Müller-Steinhagen
DLR, Stuttgart, DE

Prof. Dr. Ph. R. von Rohr
ETH Zurich, CH

Prof. Dr. A. Voss
University of Stuttgart, DE

Dr. R. Schmitz
Swiss Federal Office of Energy, Berne, CH

Organizational Structure

Research Commission
Prof. Dr. Roland Horisberger

Large-Scale Project SwissFEL
Dr. Hans-Heinrich Braun/Dr. Rafael Abela

Competence Center for Energy and Mobility (CCEM-CH)
Operating Director: Dr. Philipp Dietrich

Center for Proton Therapy
Prof. Dr. Eugen Hug

Director:
Prof. Dr. Joël Mesot

Members of the board of directors:
Martin Jermann, Head of Staff*
Dr. Kurt N. Clausen
Prof. Dr. J. Friso van der Veen*
Prof. Dr. Alexander Wokaun*
Dr. Jean-Marc Cavedon
Prof. Dr. Gebhard Schertler
Prof. Dr. Leonid Rivkin
Dr. Peter Allenspach

Human Resources
Ursula Schmid

Safety
Dr. Roger Andres

Communications
Dagmar Baroke

Technology Transfer
Robert Rudolph

Research Department **Research with Neutrons and Muons (NUM)** Dr. Kurt N. Clausen	Particle Physics	Prof. Dr. Klaus Kirch
	Neutron Scattering	Prof. Dr. Andrey Zheludev
	Spallation Neutron Source Division	Dr. Werner Wagner
	Muon Spin Spectroscopy	Prof. Dr. Elvezio Morenzoni
	Development and Methods	Dr. Michel Kenzelmann
Research Department **Synchrotron Radiation and Nanotechnology (SYN)** Prof. Dr. J. Friso van der Veen	Macromolecules and Bioimaging	Dr. Clemens Schulze-Briese
	Condensed Matter	Dr. Christoph Quitmann
	Micro- and Nanotechnology	Prof. Dr. Jens Gobrecht
Research Department **General Energy (ENE)** Prof. Dr. Alexander Wokaun	Bioenergy and Catalysis	Dr. Oliver Kröcher
	Solar Technology	Prof. Dr. Aldo Steinfeld
	Combustion Research	Dr. Peter Jansohn
	Electrochemistry	Dr. Günther Scherer
	Atmospheric Chemistry	Prof. Dr. Urs Baltensperger
Research Department **Nuclear Energy and Safety (NES)** Dr. Jean-Marc Cavedon	Reactor Physics and Systems Behaviour	Martin Zimmermann a.i.
	Thermal Hydraulics	Prof. Dr. Horst-Michael Prasser
	Hot Laboratory	Dr. Didier Gavillet
	Waste Management	Dr. Michael Bradbury
	Nuclear Materials	Hans-Peter Seifert a.i.
Research Department **Biology and Chemistry (BIO)** Prof. Dr. Gebhard Schertler	Center for Radiopharmaceutical Sciences	Prof. Dr. August Schubiger
	Biomolecular Research	Prof. Dr. Gebhard Schertler i.P.
	Radiochemistry and Environmental Chemistry	Prof. Dr. Andreas Türler
Department **Large Research Facilities (GFA)** Prof. Dr. Leonid Rivkin	Accelerator/Concepts and Development	Dr. Terence Garvey
	Accelerator/Operation and Development	Dr. Mike Seidel
	Technical Support, Co-ordination and Operation	Jürgen Duppich
Department **Logistics (LOG)** Dr. Peter Allenspach	Finance and Administrative Services	Karlheinz Falk
	Buildings and Services	Lilian Jakob
	Infrastructure and Electrical Engineering	Max Huser
	Mechanical Engineering Sciences	Dr. Urs Ellenberger
	Information Technology	Dr. Stephan Egli
	Radiation Safety and Security	Christian Wernli
	Communications	Dagmar Baroke

Energy and Environment
Prof. Dr.
Jeroen van Bokhoven

Energy Systems Analysis
Dr. Stefan Hirschberg

* Executive Committee / Deputy Directors

Where to find what

On CD and online
The publication lists for all PSI departments can be found on the CD version of this report, which can be ordered at www.psi.ch (Media/ Info Material) or by phone +41 (0)56 310 21 11.

The lists include the following:
- Peer-reviewed publications
- Invited talks
- Dissertations
- Conference Proceedings
- Lectures

Also included on the CD is the Annual Report (Jahresbericht) in German.

Links to other research not featured here can be found on our website: www.psi.ch (Research at PSI).

LIST OF PUBLICATIONS 2009

Center for Proton Therapy

Ares C., Khan S., Macartain A.M., Heuberger J., Goitein G., Gruber G., Lutters G., Hug E.B., Bodis S., Lomax A.J. *Postoperative Proton Radiotherapy for Localized and Locoregional Breast Cancer: Potential for Clinically Relevant Improvements?* Int J Radiat Oncol Biol Phys. 2009 Jul 15. [Epub ahead of print]

Mumot M., Algranati C., Hartmann M., Schippers J.M., Hug E.B, Lomax A.J.
Proton range verification using a range probe:Definition of concept and initial analysis
under submission to PMB

Rutz H.P., Staab A., Lomax A.J., Ares C., Timmermann B., Weber D.C., Bolsi A., Negreanu C., Hug E.B., Goitein G. *Spot Scanning Proton Radiation Therapy for Extra-cranial Chordomas: Five-year Outcomes in Patients Treated at PSI.* Int J Radiat Oncol Biol Phys 2008:72(S1): S504-S505.

Rutz H.P., Weber D.C., Goitein G., Ares C., Bolsi A., Lomax A.J., Pedroni E., Coray A., Hug E.B., Timmermann B. *Postoperative spot-scanning proton radiation therapy for chordoma and chondrosarcoma in children and adolescents: initial experience at Paul Scherrer Institute.* Int J Radiat Oncol Biol Phys. 2008 May 1;71(1):220-5.

Peer reviewed papers

van de Water S., Kreuger R., Zenklusen S., Hug E.B., Lomax A.J. *Tumor tracking with scanned proton beams: assessing the accuracy and practicalities.* Phys.Med.Biol. 54 (2009) 6549-6563

Proceedings and conference abstracts

Albertini F., Lomax A.J., Hug E.B.
The influence of starting conditions on the robustness of intensity modulated proton therapy plans.
PTCOG , Heidelberg, September-October, 2009

Albertini F., Lomax A.J., Hug E.B. *Intensity Modulated Proton Therapy (IMPT): influence of starting conditions on the optimized dose distribution.* 4th International Conference on Translational Research in Radiation Oncology, Geneva, March 2009

Algranati C., Mumot M., Lin S., Hartmann M., Grossmann M., Schippers J. M., Hug E., Lomax A.
Proton range verification using a range probe:Definition of concept, initial analysis and measurements. Poster 136, PTCOG 48, Heidelberg

Ares C., Khan S., McArtain A., Heuberger J., Gruber G., Lutters G., Hug E.B., Bodis S., Lomax A.J. *Postoperative Proton Radiotherapy in Loco-Regional Breast Cancer: Potential for Clinically Relevant Improvements?* 4th International Conference on Translational Research in Radiation Oncology, Geneva, March 2009

Comi S., Bolsi A., Hug E.B., Lomax A.J.
The dosimetric effect of residual positioning errors on spot scanned proton therapy. SASROXII, Baden, March 2009

Frenzel N., Hug E.B., Lomax A.J., Staab A., Sartori A., Pruschy M.
Differential DNA Repair Mechanisms in Response to Proton and Photon Irradiation. PTCOG , Heidelberg, September-October, 2009

Hug E.B., Lomax A.J., Ares C., Timmermann B., Rutz H.P., Schneider R., Pedroni E., Goitein G. *Clinical Results of Spot Scanning Based Proton Radiotherapy: Experience at the Paul Scherrer Institute since 1996.* ASTRO 2009, Chicago.

Krayenbuehl J., Kunz G., Hartmann M., Hug E.B., Lomax A.J., Ciernik I.F. *Evaluation of air cavities after extrapleural pleuropneumectomy in mesothelioma patient during IMRT or PT.* SASROXII, Baden, March 2009.

Mumot M., Algranati C., Hartmann M., Schippers J.M., Hug E.B., Lomax A.J. *Proton range verifications using a range probe: Definition of concept and initial analysi.* SASROXII, Baden, March 2009

Mumot M., Algranati C., Hartmann M., Schippers J.M., Hug E.B., Lomax A.J. *Proton range verification using a range probe: Definition of concept and initial analysis and measurements.* PTCOG48 , Heidelberg, September-October, 2009

Pedrazzi L., Salk J., Hartmann M., Hug E.B., Lomax A.J. *How well can the proton dose behind metal implants be calculated based on CT data alone?* SASROXII, Baden, March 2009

Pehlivan B., Ares C., Stadelmann O., Lomax A.J., Hug E.B. *Temporal lobe damage following active scanning proton radiation therapy for skull base tumors.* Eur J Cancer 2009; 7(2):S154-S155

Rutz H.P., Staab A., Timmermann B., Ares C., Lomax A.J., Goitein G., Hug E.B. *Spot-scanning proton radiation therapy for extra-cranial chordoma.* PTCOG48, Heidelberg, September-October, 2009

Staab A., Rutz H.P., Goitein G., Timmermann B., Ares C., Schneider R., Lomax A.J., Hug. E.B. *Spot-Scanning Proton Radiation Therapy for Extra-Cranial Chondrosarcoma.* PTCOG48, Heidelberg, September-October, 2009

Staab A., Rutz H.P., Lomax A.J., Timmermann B., Schneider R., Ares C., Algranati C., Goitein G., Hug E.B. *Extra-Cranial Chordoma treated with Spot-Scanning Proton Radiation Therapy: Possible correlation between surgical stabilization, quality of DVH`s and clinical outcome.* PTCOG48, Heidelberg, September-October, 2009

Staab A., Frenzel N., Coray A., Lomax A.J., Schneider R., Pruschy M., Hug E.B. *Effectiveness of protons in human prostate cell lines: the genetic background possibly determines the RBE in the Spread-out-bragg-peak compared to Plateau region.* PTCOG48 , Heidelberg, September-October, 2009

van de Water T., Lomax A.J., Bijl H.P., Schilstra C., Hug E.B., Langendijk J.A. *Sparing the salivary glands with scanned protons in head and neck radiotherapy: Benefits of 6-field Intensity Modulated Proton Therapy (IMPT) as compared to 3-field IMPT.* PTCOG, Heidelberg, September-October, 2009

Verwey J., Heufelder J., Assenmacher F., van Goethem M.-J., Tourovsky A., Grossmann M., Lomax A.J., Goitein G., Jermann M., Zografos L., Hug E.B.*OPTIS2: a new treatment facility at PSI 25 years after introducing ocular proton therapy in Europe –project challenges and comparison with OPTIS.* PTCOG48, Heidelberg, September-October, 2009

Widesott L., Albertini F., Lomax A.J., Hug E.B., Pierelli A., Fiorino C., Schneider R. *Impact of bowel cavity variation on IMPT prostate plans.* SASROXII, Baden, March 2009.

Invited Presentations/Talks

Hug E. B.
Role of Tumor Boards in Oncologic Care
13. Alpbacher Seminar für Radio-Onkologie. Alpbach/Tirol, Austria, February 11 – 14, 2009.

Hug E. B.
Seminar for Swiss Radiation Oncology Residents, Swiss society for Radio-oncology, Bern, 6th March 2009.

Hug E. B.
Proton Radiotherapy (PT) at Paul Scherrer Institute: the first year of continous clinical operation
SASRO 2009, Baden, March 19, 2009

Hug E. B.
Neue Therapien – das Beispiel der Protonentherapie bei Kindern
Seminar, CE-lecture, Swiss Cancer League, Bern, March 17, 2009

Hug E. B.
Hadronentherapy – Bedeutung für den Patienten
Enquete des Niederösterreichischen Landtages. St. Pölten, Österreich, September 3, 2009

Hug E. B.
Interdisziplinäres Symposium Neuroonkologie Kantonsspital Aarau (invited Talk).
September 10, 2009.

Lomax A.J..
Image Guided Proton Therapy: The next big thing in radiotherapy?
Invited seminar, Christie hospital, Manchester, December 22, 2009

Lomax A.J., Bolsi A., Albertini F., Negreanu C.
This is not an apple
Invited seminar, University Hospital Zurich, December 16, 2009

Lomax A.J., Bolsi A., Albertini F., Negreanu C.
This is not an apple
Science for Humanity Symposium, PSI, November 13, 2009

Lomax A.J.
Intensity Modulated Proton Therapy: The future of particle therapy
Elekta user meeting, ASTRO, Chicago, 2009

Lomax A.J.
IMPT and plan robustness
PTCOG , Heidelberg, October 3, 2009

Lomax A.J.
Treatment planning for scanned proton beams and IMPT
PTCOG teaching course, Heidelberg, September 29, 2009

Lomax A.J.
Clinical aspects of proton therapy
Invited seminar, Addenbrookes Hospital Canbridge, Sepember 15, 2009

Lomax A.J.
The principles and promise of scanned proton beam therapy
Royal College of Radiologists Annual Clinical Oncology meeting, London, September 14, 2009

Lomax A.J.
Principles, possibilities and challenges with scanned proton therapy
10th Bienneal ESTRO conference, Maastricht, August 2009

Lomax A.J.
Proton and light ion therapy
Mayneord-Phillips Summer School, Oxford, July 8, 2009

Lomax A.J.
Future directions and current challenges of proton therapy
BIR presidents conference, London, May 19, 2009

Lomax A.J.
Imaging and new technology developments in charged particle therapy
Invited workshop presentation, 100th American Association of Cancer Research (AACR), Denver, April 18, 2009

Lomax A.J., Salk J.
Dosimetry and QA for proton radiotherapy
Invited Seminar, University of Pennsylvania, April 1, 2009

Lomax A.J.
Treatment planning for scanned proton beams
Invited workshop presentation, University of Pennsylvania Proton training meeting, March 30, 2009

Lomax A.J., Albertini F., Negreanu C., Comi S., Bolsi A.
Intensity Modulated Proton Therapy and its sensitivity to treatment uncertainties
Invited workshop presentation, 4th International Conference on Translational Research in Radiation Oncology, Geneva, March 11, 2009

Pedroni E.
Initial commissioning of the beamline of the new Gantry 2 of PSI
SASRO 2009, Baden, March 19, 2009

Pedroni E.
Gantry design and experience at PSI
Workshop on Hadron Beam Therapy of Cancer
Ettore Majorana Foundation and Centre for Scientific Culture, Erice, April 26, 2009

Pedroni E.
Summary of the session on delivery systems and gantries
Workshop on Hadron Beam Therapy of Cancer Ettore Majorana Foundation and Centre for Scientific Culture, Erice, May 1, 2009

Pedroni E.
The second generation scanning proton gantry at PSI
PTCOG 48, Heidelberg. October 1, 2009

LIST OF PUBLICATIONS 2009

Synchrotron Radiation and Nanotechnology SYN

UNIVERSITY LEVEL AND OTHER TEACHING

M. Bednarzik, J. Gobrecht, V. Guzenko, C. Padeste, H. Schift, A. Weber
Micro- and Nanofabrication
Blockkurs (Praktikum) for University of Basel, 1 week, Villigen PSI, 07-11.09.2009 (Masterstudiengang)

C. David
X-Ray Optics – Coherence – Phase Contrast
HERCULES Specialised Courses: Synchrotron Radiation Contribution to Nanoscience Grenoble, France, 18.05.2009

Y. Ekinci
Micro- and Nanostructuctured Metallic Systems
Summer Semester 2009, Department of Materials, ETH Zurich

A. Fraile Rodriguez
Imaging Magnetic Nanostructures using soft x-ray spectromicroscopy
PSI Summer school, Practical Training at the Paul Scherrer Institut, Villigen, Switzerland, 08-10.08.2009

J. Gobrecht, H. Schift
Nanotechnologie für Ingenieure
Fachhochschule Nordwestschweiz (FHNW), Windisch, HS 2009/10 (Bachelorstudiengang)

J. Gobrecht, H. Schift
Applied Micro- and Nanotechnology - Etching techniques, nanoimprint, hot embossing, injection moulding, self-assembly
Zürcher Fachhochschule für Angewandte Wissenschaften (ZHAW), Zürich, HS 2008/09 (Masterstudiengang MSE Studium)

L.J. Heyderman
Two Dimensional Magnetic Nanostructures
Seminar, PSI Summer School on Condensed Matter Research (Functional Materials), Zuoz, Switzerland, 01-07.08.2009

M. Janousch
An Introduction to XAS and its applications
XLIV Zakpoane School of Physics, Zakopane, Poland, 18-23.05.2009

M. Janousch
X-ray absortion spectroscopy
8th PSI Summer School on Condensed Matter Research, Zuoz, Switzerland, 01-07.08.2009

T. Jung
Oberflächenphysik
Universitaet Basel, Studiengänge Physik und Nanowissenschaften,
Vorlesung mit Uebungen HS2009

T. Jung
Rastertunnelmikroskopie an Supramolekularen Strukturen im Ultrahochvakkuum
Blockkurs (Praktikum) for University of Basel, 2 x 2 Wochen, Nanolab der Uni Basel

T. Jung
Oberflächenphysik, auch mit Synchrotronstrahlen
Blockkurs (Praktikum) for University of Basel, 3 x 2 Wochen, Villigen PSI

F. Marone
The TOMCAT instrument
International Training School on Advanced Radiography Methods in Wood Research, PSI, Villigen, Switzerland, 18.11.2009

F. Meier
Übungen Physik 1
Universität Zürich, Switzerland, 14.09-19.12.2009

F. Nolting
Imaging Magnetic Nanostructures using soft x-ray spectromicroscopy
PSI Summer school, Practical Training at the Paul Scherrer Institut, Villigen, Switzerland, 08-10.08.2009

C. Padeste
Fabrication of nanostructures and protein patterns for biological applications
4th International Summer School on Advanced Biotechnology, Basel, Switzerland 30.8.-3.9.2009

B. Patterson, H. Sigg, H. Weyer
Synchrotron Praktikum
SLS, PSI, Switzerland 17-21.08.2009

C. Schulze-Briese
Crystallography Course
by C. Giacovazzo, jointly organised with Fabia Gozzo, 01.04-12.05.2009

C. Schulze-Briese
EMBL BioSAXS
Course at PSI, Villigen, Switzerland, 02.07-09.12.2009

M. Stampanoni, P. Schneider
Micro and Nano-Tomography of Biological Tissues
ETHZ-Lecture: 227-0965-00L

M. Stampanoni, P. Bösiger, K. Prüssmann, J. Vörös, M. Rudin
Research Topics in Biomedical Engineering
ETHZ-Lecture: 227-0970-00L

M. Stampanoni et al.
CIMST Interdisciplinary Summer School on Bio-Medical Imaging
ETHZ-Lecture: 551-1316-00L

J.F. van der Veen,
Materials research using synchrotron radiation
Masters course ETH Zürich, HS 2009

P. Willmott
An Introduction to Laser Physics and Laser Spectroscopy
Sommersemester 2009, Physical Chemistry, University of Zürich

P. Willmott
An Introduction to Synchrotron Radiation: Techniques and Applications
Herbstsemester 2009, Physical Chemistry, University of Zürich

PUBLICATIONS WITH SYN AUTHOR(S) AND DESCRIBING AN SLS EXPERIMENT

Agostini G, Lamberti C, Palin L, Milanesio M, Danilina N, Xu B, Janousch M, van Bokhoven JA
In Situ XAS and XRPD Parametric Rietveld Refinement To Understand Dealumination of Y Zeolite Catalyst
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 132, 667 (2009)

Alayon EMC, Singh J, Nachtegaal M, Harfouche M, van Bokhoven JA
On highly active partially oxidized platinum in carbon monoxide oxidation over supported platinum catalysts
JOURNAL OF CATALYSIS 263, 228 (2009)

Altomare A, Belviso BD, Burla MC, Campi G, Cuocci C, Giacovazzo C, Gozzo F, Moliterni A, Polidori G, Rizzi R
Multiple-wavelength anomalous dispersion techniques applied to powder data: a probabilistic method for finding the substructure via joint probability distribution functions
JOURNAL OF APPLIED CRYSTALLOGRAPHY 42, 30 (2009)

Altomare A, Burla MC, Cuocci C, Giacovazzo C, Gozzo F, Moliterni A, Polidori G, Rizzi R
MAD techniques applied to powder data: finding the structure given the substructure
ACTA CRYSTALLOGRAPHICA SECTION A 65, 291 (2009)

Andreasson BP, Janousch M, Staub U, Meijer GI
Spatial distribution of oxygen vacancies in Cr-doped SrTiO3 during an electric-field-driven insulator-to-metal transition
APPLIED PHYSICS LETTERS 94, 013513 (2009)

Andreasson BP, Janousch M, Staub U, Todorova T, Delley B, Meijer GI, Pomjakushina E
Detecting oxygen vacancies in SrTiO3 by 3d transition-metal tracer ions
PHYSICAL REVIEW B 80, 212103 (2009)

Andreasson P, Janousch M, Staub U, Meijer I, Ramar A, Krbanjevic J, Schaeublin R
Origin of oxygen vacancies in resistive switching memory devices
JOURNAL OF PHYSICS: CONFERENCE SERIES 190, 012074 (2009)

Auzelyte V, Dais C, Farquet P, Grutzmacher D, Heyderman LJ, Luo F, Olliges S, Padeste C, Sahoo PK, Thomson T, Turchanin A, David C, Solak HH
Extreme ultraviolet interference lithography at the Paul Scherrer Institut
JOURNAL OF MICRO-NANOLITHOGRAPHY MEMS AND MOEMS 8, 021204 (2009)

Auzelyte V, Langner A, Solak HH
Thermal development of a calixarene resist
JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B 27, 2990 (2009)

Beaud P, Johnson SL, Vorobeva E, Staub U, De Souza RA, Milne CJ, Jia QX, Ingold G
Ultrafast Structural Phase Transition Driven by Photoinduced Melting of Charge and Orbital Order
PHYSICAL REVIEW LETTERS 103, 155702 (2009)

Bechtel HA, Martin MC, May TE, Lerch P
Improved spatial resolution for reflection mode infrared microscopy
REVIEW OF SCIENTIFIC INSTRUMENTS 80, 126106 (2009)

Becker J, Fluckiger R, Reum M, Buchi FN, Marone F, Stampanoni M
Determination of Material Properties of Gas Diffusion Layers: Experiments and Simulations Using Phase Contrast Tomographic Microscopy
JOURNAL OF THE ELECTROCHEMICAL SOCIETY 156, B1175 (2009)

Bellusci A, Ghedini M, Giorgini L, Gozzo F, Szerb EI, Crispini A, Pucci D
Anion dependent mesomorphism in coordination networks based on 2,2 '-bipyridine silver(I) complexes
DALTON TRANSACTIONS 36, 7381 (2009)

Bergamaschi A, Cervellino A, Dinapoli R, Gozzo F, Henrich B, Johnson I, Kraft P, Mozzanica A, Schmitt B, Shi X
Photon counting microstrip detector for time resolved powder diffraction experiments
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT 604, 136 (2009)

Bodi A, Johnson M, Gerber T, Gengeliczki Z, Sztaray B, Baer T
Imaging photoelectron photoion coincidence spectroscopy with velocity focusing electron optics
REVIEW OF SCIENTIFIC INSTRUMENTS 80, 034101 (2009)

Bodi A, Shuman NS, Baer T
On the ionization and dissociative photoionization of iodomethane: a definitive experimental enthalpy of formation of CH3I
PHYSICAL CHEMISTRY CHEMICAL PHYSICS 11, 11013 (2009)

Boero G, Rusponi S, Bencok P, Meckenstock R, Thiele JU, Nolting F, Gambardella P
Double-resonant x-ray and microwave absorption: Atomic spectroscopy of precessional orbital and spin dynamics
PHYSICAL REVIEW B 79, 224425 (2009)

Boero G, Rusponi S, Kavich J, Rizzini AL, Piamonteze C, Nolting F, Tieg C, Thiele JU, Gambardella P
Longitudinal detection of ferromagnetic resonance using x-ray transmission measurements
REVIEW OF SCIENTIFIC INSTRUMENTS 80, 123902 (2009)

Bosak A, Hoesch M, Krisch M, Chernyshov D, Pattison P, Schulze-Briese C, Winkler B, Milman V, Refson K, Antonangeli D, Farber D
3D Imaging of the Fermi Surface by Thermal Diffuse Scattering
PHYSICAL REVIEW LETTERS 103, 076403 (2009)

Boulle O, Heyne L, Rhensius J, Klaui M, Rudiger U, Joly L, Le Guyader L, Nolting F, Heyderman LJ, Malinowski G, Swagten HJM, Koopmans B, Ulysse C, Faini G
Reversible switching between bidomain states by injection of current pulses in a magnetic wire with out-of-plane magnetization
JOURNAL OF APPLIED PHYSICS 105, 07C106 (2009)

Braun A, Ovalle A, Pomjakushin V, Cervellino A, Erat S, C Stolte W, Graule T
Yttrium and hydrogen superstructure and correlation of lattice expansion and proton conductivity in the BaZr0.9Y0.1O2.95 proton conductor
APPLIED PHYSICS LETTERS 95, 22 (2009)

Bressler C, Milne C, Pham VT, ElNahhas A, van der Veen RM, Gawelda W, Johnson S, Beaud P, Grolimund D, Kaiser M, Borca CN, Ingold G, Abela R, Chergui M
Femtosecond XANES Study of the Light-Induced Spin Crossover Dynamics in an Iron(II) Complex
SCIENCE 323, 489 (2009)

Brugger T, Gunther S, Wang B, Dil JH, Bocquet ML, Osterwalder J, Wintterlin J, Greber T
Comparison of electronic structure and template function of single-layer graphene and a hexagonal boron nitride nanomesh on Ru(0001)
PHYSICAL REVIEW B 79, 045407 (2009)

Bukowiecki N, Richard A, Furger M, Weingartner E, Aguirre M, Huthwelker T, Lienemann P, Gehrig R, Baltensperger U
Deposition Uniformity and Particle Size Distribution of Ambient Aerosol Collected with a Rotating Drum Impactor
AEROSOL SCIENCE AND TECHNOLOGY 43, 891 (2009)

Bunk O, Bech M, Jensen T, Feidenhansl R, Binderup T, Menzel A, Pfeiffer F
Multimodal x-ray scatter imaging
NEW JOURNAL OF PHYSICS 11, 123016 (2009)

Buonsanti R, Snoeck E, Giannini C, Gozzo F, Garcia-Hernandez M, Garcia MA, Cingolani R, Cozzoli PD
Colloidal semiconductor/magnetic heterostructures based on iron-oxide-functionalized brookite TiO2 nanorods
PHYSICAL CHEMISTRY CHEMICAL PHYSICS 11, 3680 (2009)

Claesson T, Mansson M, OEnsten A, Shi M, Sassa Y, Pailhes S, Chang J, Bendounan A, Patthey L, Mesot J, Muro T, Matsushita T, Kinoshita T, Nakamura T, Momono N, Oda M, Ido M, Tjernberg O
Electronic structure of La1.48Nd0.4Sr0.12CuO4 probed by high-and low-energy angle-resolved photoelectron spectroscopy
PHYSICAL REVIEW B 80, 094503 (2009)

Coulibaly F, Chiu E, Gutmann S, Rajendran C, Haebel PW, Ikeda K, Mori H, Ward VK, Schulze-Briese C, Metcalf P
The atomic structure of baculovirus polyhedra reveals the independent emergence of infectious crystals in DNA and RNA viruses
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 22205 (2009)

Dais C, Mussler G, Sigg H, Mueller E, Solak HH, Grutzmacher D
Evolution and stability of ordered SiGe islands grown on patterned Si(100) substrates
JOURNAL OF APPLIED PHYSICS 105, 122405 (2009)

Degueldre C, Kuri G, Borca CN, Grolimund D
X-ray micro- fluorescence, diffraction and absorption spectroscopy for local structure investigation of a radioactive zinc ferrite deposit
CORROSION SCIENCE 51, 1690 (2009)

Deyhle H, Bunk O, Buser S, Krastl G, Zitzmann NU, Ilgenstein B, Beckmann F, Pfeiffer F, Weiger R, Mueller B
Bio-inspired dental fillings
PROCEEDINGS OF THE SPIE - THE INTERNATIONAL SOCIETY FOR OPTICAL ENGINEERING 7401, 74010E (2009)

Dil JH
Spin and angle resolved photoemission on non-magnetic low-dimensional systems
JOURNAL OF PHYSICS-CONDENSED MATTER 21, 403001 (2009)

Djerdj I, Cao MH, Rocquefelte X, Cerny R, Jaglicic Z, Arcon D, Potocnik A, Gozzo F, Niederberger M
Structural Characterization of a Nanocrystalline Inorganic-Organic Hybrid with Fiberlike Morphology and One-Dimensional Antiferromagnetic Properties
CHEMISTRY OF MATERIALS 21, 3356 (2009)

Eckermann F, Suter T, Uggowitzer PJ, Afseth A, Stampanoni M, Marone F, Schmutz P
In Situ Microtomographically Monitored and Electrochemically Controlled Corrosion Initiation and Propagation in AlMgSi Alloy AA6016
JOURNAL OF THE ELECTROCHEMICAL SOCIETY 156, C1 (2009)

Farges F, Meibom A, Flank A-M, Lagarde P, Janousch M, Stolarski J
Speciation of Mg in biogenic calcium carbonates
JOURNAL OF PHYSICS: CONFERENCE SERIES 190, 012175 (2009)

Ferreira ESB, Boon JJ, van der Horst J, Scherrer NC, Marone F, Stampanoni M
3D Synchrotron x-ray microtomography of paint samples
PROCEEDINGS OF THE SPIE - THE INTERNATIONAL SOCIETY FOR OPTICAL ENGINEERING 7931, 7931L (2009)

Flechsig U, Jaggi A, Spielmann S, Padmore HA, MacDowell AA
The optics beamline at the Swiss Light Source
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT 609, 281 (2009)

Flury B, Frommer J, Eggenberger U, Mader U, Nachtegaal M, Kretzschmar R
Assessment of Long-Term Performance and Chromate Reduction Mechanisms in a Field Scale Permeable Reactive Barrier
ENVIRONMENTAL SCIENCE & TECHNOLOGY 43, 6786 (2009)

Froideval A, Abolhassani S, Gavillet D, Grolimund D, Borca C, Krbanjevic J, Degueldre C
Microprobe analysis of neutron irradiated and autoclaved zirconium niobium claddings using synchrotron-based hard X-ray imaging and spectroscopy
JOURNAL OF NUCLEAR MATERIALS 385, 346 (2009)

Froideval A, Samaras M, Iglesias R, Pouchon MA, Chen JC, Grolimund D, Raabe J, Schuppler S, Victoria M, Hoffelner W
Application of Synchrotron Radiation Techniques for Model Validation of Advanced Structural Materials
ADVANCED ENGINEERING MATERIALS 11, 459 (2009)

Fromherz T, Stangl J, Lechner RT, Wintersberger E, Bauer G, Holy V, Dais C, Muller E, Sigg H, Solak HH, Grutzmacher D
3D SiGe QUANTUM DOT CRYSTALS: STRUCTURAL CHARACTERIZATION AND ELECTRONIC COUPLING
INTERNATIONAL JOURNAL OF MODERN PHYSICS B 23, 2836 (2009)

Frommer J, Nachtegaal M, Czekaj I, Weng TC, Kretzschmar R
X-ray Absorption and Emission Spectroscopy of Cr-III (Hydr)Oxides: Analysis of the K-Pre-Edge Region
JOURNAL OF PHYSICAL CHEMISTRY A 113, 12171 (2009)

Garcia-Fernandez M, Staub U, Bodenthin Y, Scagnoli V, Pomjakushin V, Lovesey SW, Mirone A, Herrero-Martin J, Piamonteze C, Pomjakushina E
Orbital Order at Mn and O Sites and Absence of Zener Polaron Formation in Manganites
PHYSICAL REVIEW LETTERS 103, 097205 (2009)

Gawelda W, Pham VT, van der Veen RM, Grolimund D, Abela R, Chergui M, Bressler C
Structural analysis of ultrafast extended x-ray absorption fine structure with subpicometer spatial resolution: Application to spin crossover complexes
JOURNAL OF CHEMICAL PHYSICS 130, 124520 (2009)

Ghiringhelli G, Piazzalunga A, Dallera C, Schmitt T, Strocov VN, Schlappa J, Patthey L, Wang X, Berger H, Grioni M
Observation of Two Nondispersive Magnetic Excitations in NiO by Resonant Inelastic Soft-X-Ray Scattering
PHYSICAL REVIEW LETTERS 102, 027401 (2009)

Ghiringhelli G, Piazzalunga A, Wang X, Bendounan A, Berger H, Bottegoni F, Christensen N, Dallera C, Grioni M, Grivel JC, Sala MM, Patthey L, Schlappa J, Schmitt T, Strocov V, Braicovich L
Crystal field and low energy excitations measured by high resolution RIXS at the L-3 edge of Cu, Ni and Mn
EUROPEAN PHYSICAL JOURNAL-SPECIAL TOPICS 169, 199 (2009)

Giewekemeyer K, Thibault P, Kalbfleisch S, Beerlink A, Kewish CM, Dierolf M, Pfeiffer F, Salditt T
Quantitative biological imaging by ptychographic x-ray diffraction microscopy
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 107, 529 (2009)

Graf C, Hofmann A, Ackermann T, Boeglin C, Viswanatha R, Peng XG, Rodriguez AF, Nolting F, Ruhl E
Magnetic and Structural Investigation of ZnSe Semiconductor Nanoparticles Doped With Isolated and Core-Concentrated Mn2+ Ions
ADVANCED FUNCTIONAL MATERIALS 19, 2501 (2009)

Grolimund D, Gunther D, Borca CN, Van Loon L, Stampanoni M, Marone F, Barmettler K, Aeschlimann B, Wersin P, Heald SM
Contaminant transport in complex heterogeneous geological media: New insights through micro-imaging and micro-spectroscopy
GEOCHIMICA ET COSMOCHIMICA ACTA 73, A468 (2009)

Grunwaldt JD, Beier M, Kimmerle B, Baiker A, Nachtegaal M, Griesebock B, Lutzenkirchen-Hecht D, Stotzeld J, Frahm R
Structural changes of noble metal catalysts during ignition and extinction of the partial oxidation of methane studied by advanced QEXAFS techniques
PHYSICAL CHEMISTRY CHEMICAL PHYSICS 11, 8779 (2009)

Grunwaldt JD, Kimmerle B, Baiker A, Boye P, Schroer CG, Glatzel P, Borca CN, Beckmann F
Catalysts at work: From integral to spatially resolved X-ray absorption spectroscopy
CATALYSIS TODAY 145, 267 (2009)

Haberthuer D, Semmler-Behnke M, Takenaka S, Kreyling WG, Stampanoni M, Tsuda A, Schittny JC
Multimodal imaging for the detection of sub-micron particles in the gas-exchange region of the mammalian lung
JOURNAL OF PHYSICS: CONFERENCE SERIES 186, 012040 (2009)

Hase M, Donni A, Pomjakushin VY, Keller L, Gozzo F, Cervellino A, Kohno M
Magnetic structure of Cu2CdB2O6 exhibiting a quantum-mechanical magnetization plateau and classical antiferromagnetic long-range order
PHYSICAL REVIEW B 80, 104405 (2009)

Henrich B, Bergamaschi A, Broennimann C, Dinapoli R, Eikenberry EF, Johnson I, Kobas M, Kraft P, Mozzanica A, Schmitt B
PILATUS: A single photon counting pixel detector for X-ray applications
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT 607, 247 (2009)

Heyne L, Rhensius J, Cho YJ, Bedau D, Krzyk S, Dette C, Korner HS, Fischer J, Laufenberg M, Backes D, Heyderman LJ, Joly L, Nolting F, Tatara G, Kohno H, Seo S, Rudiger U, Klaui M
Geometry-dependent scaling of critical current densities for current-induced domain wall motion and transformations
PHYSICAL REVIEW B 80, 184405 (2009)

Hintermueller C, S Coats J, Obenaus A, Nelson G, Krucker T, Stampanoni M
3D quantification of brain microvessels exposed to heavy particle radiation
JOURNAL OF PHYSICS: CONFERENCE SERIES 186, 012087 (2009)

Hoesch M, Petrov VN, Muntwiler M, Hengsberger M, Lobo Checa J, Greber T, Osterwalder J
Two- and three-dimensional band structure of ultrathin Ni on Cu(001)
PHYSICAL REVIEW B 79, 155404 (2009)

Hofmann A, Cui XY, Schafer J, Meyer S, Hopfner P, Blumenstein C, Paul M, Patthey L, Rotenberg E, Bunemann J, Gebhard F, Ohm T, Weber W, Claessen R
Renormalization of Bulk Magnetic Electron States at High Binding Energies
PHYSICAL REVIEW LETTERS 102, 187204 (2009)

Holy V, Stangl J, Fromherz T, Lechner RT, Wintersberger E, Bauer G, Dais C, Muller E, Grutzmacher D
X-ray diffraction investigation of a three-dimensional Si/SiGe quantum dot crystal
PHYSICAL REVIEW B 79, 035324 (2009)

Hsieh D, Xia Y, Qian D, Wray L, Dil JH, Meier F, Osterwalder J, Patthey L, Checkelsky JG, Ong NP, Fedorov AV, Lin H, Bansil A, Grauer D, Hor YS, Cava RJ, Hasan MZ
A tunable topological insulator in the spin helical Dirac transport regime
NATURE 460, 1101 (2009)

Hsieh D, Xia Y, Wray L, Qian D, Pal A, Dil JH, Osterwalder J, Meier F, Bihlmayer G, Kane CL, Hor YS, Cava RJ, Hasan MZ
Observation of Unconventional Quantum Spin Textures in Topological Insulators
SCIENCE 323, 919 (2009)

Johnson I, Sadygov Z, Bunk O, Menzel A, Pfeiffer F, Renker D
A Geiger-mode avalanche photodiode array for X-ray photon correlation spectroscopy
JOURNAL OF SYNCHROTRON RADIATION 16, 105 (2009)

Johnson M, Bodi A, Schulz L, Gerber T
Vacuum ultraviolet beamline at the Swiss Light Source for chemical dynamics studies
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT A 610, 597 (2009)

Johnson SL, Beaud P, Vorobeva E, Milne CJ, Murray ED, Fahy S, Ingold G
Directly Observing Squeezed Phonon States with Femtosecond X-Ray Diffraction
PHYSICAL REVIEW LETTERS 102, 175503 (2009)

Johnson SL, Vorobeva E, Beaud P, Milne CJ, Ingold G
Full Reconstruction of a Crystal Unit Cell Structure during Coherent Femtosecond Motion
PHYSICAL REVIEW LETTERS 103, 205501 (2009)

Joly L, Nolting F, Kimel AV, Kirilyuk A, Pisarev RV, Rasing T
Spin-reorientation in the heterostructure Co/SmFeO3
JOURNAL OF PHYSICS-CONDENSED MATTER 21, 446004 (2009)

Kamenos NA, Cusack M, Huthwelker T, Lagarde P, Scheibling RE
Mg-lattice associations in red coralline algae
GEOCHIMICA ET COSMOCHIMICA ACTA 73, 1901 (2009)

Kappenberger P, Luo F, Heyderman LJ, Solak HH, Padeste C, Brombacher C, Makarov D, Ashworth TV, Philippe L, Hug HJ, Albrecht M
Template-directed self-assembled magnetic nanostructures for probe recording
APPLIED PHYSICS LETTERS 95, 023116 (2009)

Kleimenov E, Bergamaschi A, van Bokhoven JA, Janousch M, Schmitt B, Nachtegaal M
High- resolution hard-X-ray ﬂuorescence spectrometer
JOURNAL OF PHYSICS: CONFERENCE SERIES 190, 012035 (2009)

Kondo T, Khasanov R, Sassa Y, Bendounan A, Pailhes S, Chang J, Mesot J, Keller H, Zhigadlo ND, Shi M, Bukowski Z, Karpinski J, Kaminski A
Anomalous asymmetry in the Fermi surface of the high-temperature superconductor YBa2Cu4O8 revealed by angle-resolved photoemission spectroscopy
PHYSICAL REVIEW B 80, 100505 (2009)

Kordyuk AA, Borisenko SV, Zabolotnyy VB, Schuster R, Inosov DS, Evtushinsky DV, Plyushchay AI, Follath R, Varykhalov A, Patthey L, Berger H
Nonmonotonic pseudogap in high-T-c cuprates
PHYSICAL REVIEW B 79, 020504 (2009)

Kraft P, Bergamaschi A, Broennimann C, Dinapoli R, Eikenberry EF, Henrich B, Johnson I, Mozzanica A, Schleputz CM, Willmott PR, Schmitt B
Performance of single-photon-counting PILATUS detector modules
JOURNAL OF SYNCHROTRON RADIATION 16, 368 (2009)

Kraft P, Bergamaschi A, Bronnimann C, Dinapoli R, Eikenberry EF, Graafsma H, Henrich B, Johnson I, Kobas M, Mozzanica A, Schleputz CA, Schmitt B
Characterization and Calibration of PILATUS Detectors
IEEE TRANSACTIONS ON NUCLEAR SCIENCE 56, 758 (2009)

Liu C, Kondo T, Ni N, Palczewski AD, Bostwick A, Samolyuk GD, Khasanov R, Shi M, Rotenberg E, Bud'ko SL, Canfield PC, Kaminski A
Three- to Two-Dimensional Transition of the Electronic Structure in CaFe2As2: A Parent Compound for an Iron Arsenic High-Temperature Superconductor
PHYSICAL REVIEW LETTERS 102, 167004 (2009)

Lobo-Checa J, Matena M, Muller K, Dil JH, Meier F, Gade LH, Jung TA, Stohr M
Band Formation from Coupled Quantum Dots Formed by a Nanoporous Network on a Copper Surface
SCIENCE 325, 300 (2009)

Maass R, Van Petegem S, Borca CN, Van Swygenhoven H
In situ Laue diffraction of metallic micropillars
MATERIALS SCIENCE AND ENGINEERING A-STRUCTURAL MATERIALS PROPERTIES MICROSTRUCTURE AND PROCESSING 524, 40 (2009)

Maass R, Van Petegem S, Ma DC, Zimmermann J, Grolimund D, Roters F, Van Swygenhoven H, Raabe D
Smaller is stronger: The effect of strain hardening
ACTA MATERIALIA 57, 5996 (2009)

Maljuk A, Tsurkan V, Zestrea V, Zaharko O, Cervellino A, Loidl A, Argyriou DN
Floating-zone growth of large high-quality CoAl2O4 single crystals
JOURNAL OF CRYSTAL GROWTH 311, 3997 (2009)

Mannes D, Marone F, Lehmann E, Stampanoni M, Niemz P
Application areas of synchrotron radiation tomographic microscopy for wood research
WOOD SCIENCE AND TECHNOLOGY DOI 10.1007/, s00226-009-0257-2 (2009)

Mannini M, Pineider F, Sainctavit P, Joly L, Fraile-Rodriguez A, Arrio MA, Moulin CCD, Wernsdorfer W, Cornia A, Gotteschi D, Sessoli R
X-Ray Magnetic Circular Dichroism Picks out Single-Molecule Magnets Suitable for Nanodevices
ADVANCED MATERIALS 21, 167 (2009)

Mariager SO, Lauridsen SL, Dohn A, Bovet N, Sorensen CB, Schleputz CM, Willmott PR, Feidenhans'l R
High-resolution three-dimensional reciprocal-space mapping of InAs nanowires
JOURNAL OF APPLIED CRYSTALLOGRAPHY 42, 369 (2009)

Mariager SO, Schleputz CM, Aagesen M, Sorensen CB, Johnson E, Willmott PR, Feidenhans'l R
High-resolution three-dimensional reciprocal space mapping of semiconductor nanostructures
PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE 206, 1771 (2009)

Marone F, Hintermueller C, Mcdonald S, Abela R, Mikuljan G, Isenegger A, Stampanoni M
X-ray Tomographic Microscopy at TOMCAT
JOURNAL OF PHYSICS: CONFERENCE SERIES 186, 012042 (2009)

McDonald SA, Marone F, Hintermuller C, Mikuljan G, David C, Pfeiffer F, Stampanoni M
Advanced phase-contrast imaging using a grating interferometer
JOURNAL OF SYNCHROTRON RADIATION 16, 562 (2009)

Mcdonald SA, Marone F, Hintermueller C, Bensadoun J-C, Aebischer P, Stampanoni M
High-throughput, high-resolution X-ray phase contrast tomographic microscopy for visualisation of soft tissue
JOURNAL OF PHYSICS: CONFERENCE SERIES 186, 012043 (2009)

Meents A, Reime B, Kaiser M, Wang XY, Abela R, Weckert E, Schulze-Briese C
A fast X-ray chopper for single-bunch extraction at synchrotron sources
JOURNAL OF APPLIED CRYSTALLOGRAPHY 42, 901 (2009)

Meier F, Dil H, Lobo-Checa J, Patthey L, Osterwalder J
Quantitative vectorial spin analysis in angle-resolved photoemission: Bi/Ag(111) and Pb/Ag(111) (vol B 77, 165431, 2008)
PHYSICAL REVIEW B 79, 089902 (2009)

Meier F, Dil JH, Osterwalder J
Measuring spin polarization vectors in angle-resolved photoemission spectroscopy
NEW JOURNAL OF PHYSICS 11, 125008 (2009)

Meier F, Petrov V, Guerrero S, Mudry C, Patthey L, Osterwalder J, Dil JH
Unconventional Fermi surface spin textures in the BixPb1-x/Ag(111) surface alloy
PHYSICAL REVIEW B 79, 241408 (2009)

Mengotti E, Heyderman LJ, Bisig A, Rodriguez AF, Le Guyader L, Nolting F, Braun HB
Dipolar energy states in clusters of perpendicular magnetic nanoislands
JOURNAL OF APPLIED PHYSICS 105, 113113 (2009)

Menzel A, Dierolf M, Kewish CM, Thibault P, Jefimovs K, David C, Bech M, H Jensen T, Feidenhans'l R, Heegaard AM, Hansen R, Berthing T, Martinez K, A Als-Nielsen J, Kapishnikov S, Leiserowitz L, Pfeiffer F, Bunk O
Advanced methods in scanning X-ray microscopy
PROCEEDINGS OF THE SPIE - THE INTERNATIONAL SOCIETY FOR OPTICAL ENGINEERING 7378, 902 (2009)

Mijovilovich A, Pettersson LGM, Mangold S, Janousch M, Susini J, Salome M, de Groot FMF, Weckhuysen BM
The Interpretation of Sulfur K-Edge XANES Spectra: A Case Study on Thiophenic and Aliphatic Sulfur Compounds
JOURNAL OF PHYSICAL CHEMISTRY A 113, 2750 (2009)

Mills NJ, Stampfli R, Marone F, Bruhwiler PA
Finite element micromechanics model of impact compression of closed-cell polymer foams
INTERNATIONAL JOURNAL OF SOLIDS AND STRUCTURES 46, 677 (2009)

Milne CJ, Pham VT, Gawelda W, van der Veen RM, El Nahhas A, Johnson SL, Beaud P, Ingold G, Lima F, Vithanage DAC, Benfatto M, Grolimund D, Borca C, Kaiser M, Hauser A, Abela R, Bressler C, Chergui M
Time-resolved x-ray absorption spectroscopy: Watching atoms dance
JOURNAL OF PHYSICS: CONFERENCE SERIES 190, 012052 (2009)

Monney C, Cercellier H, Clerc F, Battaglia C, Schwier EF, Didiot C, Garnier MG, Beck H, Aebi P, Berger H, Forro L, Patthey L
Spontaneous exciton condensation in 1T-TiSe2: BCS-like approach
PHYSICAL REVIEW B 79, 045116 (2009)

Moore TA, Klaui M, Heyne L, Mohrke P, Backes D, Rhensius J, Rudiger U, Heyderman LJ, Thiele JU, Woltersdorf G, Back CH, Rodriguez AF, Nolting F, Mentes TO, Nino MA, Locatelli A, Potenza A, Marchetto H, Cavill S, Dhesi SS
Scaling of spin relaxation and angular momentum dissipation in permalloy nanowires
PHYSICAL REVIEW B 80, 132403 (2009)

Morf P, Ballav N, Nolting F, von Wrochem F, Nothofer HG, Yasuda A, Wessels JM, Jung TA
Use of Gel-Assembly to Fabricate Multi-Component Molecular Gradient Layers and the Investigation of Structure and Electron Transport Therein
CHEMPHYSCHEM 10, 2212 (2009)

Mozzanica A, Bergamaschi A, Dinapoli R, Gozzo F, Henrich B, Kraft P, Patterson B, Schmitt B
MythenII: A 128 channel single photon counting readout chip
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT 607, 250 (2009)

Mulders AM, Lawrence SM, Staub U, Garcia-Fernandez M, Scagnoli V, Mazzoli C, Pomjakushina E, Conder K, Wang Y
Direct Observation of Charge Order and an Orbital Glass State in Multiferroic LuFe2O4
PHYSICAL REVIEW LETTERS 103, 077602 (2009)

Munch B, Trtik P, Marone F, Stampanoni M
Stripe and ring artifact removal with combined wavelet - Fourier filtering
OPTICS EXPRESS 17, 8567 (2009)

Niederwanger V, Gozzo F, Griesser UJ
Characterization of Four Crystal Polymorphs and a Monohydrate of S-Bupivacaine Hydrochloride (Levobupivacaine Hydrochloride)
JOURNAL OF PHARMACEUTICAL SCIENCES 98, 1064 (2009)

Nogues J, Stepanow S, Bollero A, Sort J, Dieny B, Nolting F, Gambardella P
Simultaneous in-plane and out-of-plane exchange bias using a single antiferromagnetic layer resolved by x-ray magnetic circular dichroism
APPLIED PHYSICS LETTERS 95, 152515 (2009)

Nygard K, Satapathy DK, Buitenhuis J, Perret E, Bunk O, David C, van der Veen JF
Confinement-induced orientational alignment of quasi-2D fluids
EPL 86, 66001 (2009)

Nygard K, Satapathy DK, Bunk O, Perret E, Buitenhuis J, David C, van der Veen JF
Grating-based holographic X-ray diffraction: theory and application to confined fluids
JOURNAL OF APPLIED CRYSTALLOGRAPHY 42, 1129 (2009)

Olieric V, Rieder U, Lang K, Serganov A, Schulze-Briese C, Micura R, Dumas P, Ennifar E
A fast selenium derivatization strategy for crystallization and phasing of RNA structures
RNA-A PUBLICATION OF THE RNA SOCIETY 15, 707 (2009)

Olliges S, Frank S, Gruber PA, Auzelyte V, Kunze K, Solak HH, Spolenak R
Thermomechanical properties of gold nanowires supported on a flexible substrate
SCRIPTA MATERIALIA 60, 273 (2009)

Owen RL, Holton JM, Schulze-Briese C, Garman EF
Comments on Determination of X-ray flux using silicon pin diodes by R. L. Owen et al. (2009). J. Synchrotron Rad. 16, 143-151 Response
JOURNAL OF SYNCHROTRON RADIATION 16, 691 (2009)

Owen RL, Holton JM, Schulze-Briese C, Garman EF
Determination of X-ray flux using silicon pin diodes
JOURNAL OF SYNCHROTRON RADIATION 16, 143 (2009)

Owen RL, Pearson AR, Meents A, Boehler P, Thominet V, Schulze-Briese C
A new on-axis multimode spectrometer for the macromolecular crystallography beamlines of the Swiss Light Source
JOURNAL OF SYNCHROTRON RADIATION 16, 173 (2009)

Papagno M, Rodriguez AF, Girit CO, Meyer JC, Zettl A, Pacile D
Polarization-dependent C K near-edge X-ray absorption fine-structure of graphene
CHEMICAL PHYSICS LETTERS 475, 269 (2009)

Perez-Huerta A, Cusack M, McDonald S, Marone F, Stampanoni M, MacKay S
Brachiopod punctae: A complexity in shell biomineralisation
JOURNAL OF STRUCTURAL BIOLOGY 167, 62 (2009)

Perret E, Nygard K, Satapathy DK, Balmer TE, Bunk O, Heuberger M, van der Veen JF
X-ray reflectivity reveals equilibrium density profile of molecular liquid under nanometre confinement
EPL 88, 36004 (2009)

Podgorczyk M, Kwiatek WM, Grolimund D, Borca C
Technical aspects of Zn microanalysis of human prostate cancer tissues and cells
RADIATION PHYSICS AND CHEMISTRY 78, S53 (2009)

Podgorczyk M, Kwiatek WM, Zajac WM, Dulinska-Litewka J, Welter E, Grolimund D
Zinc in native tissues and cultured cell lines of human prostate studied by SR-XRF and XANES
X-RAY SPECTROMETRY 38, 557 (2009)

Pouchon MA, Chen J, Froideval A, Janousch M, Degueldre C
Irradiation effects in helium implanted silicon carbide measured by X-ray absorption spectrometry
JOURNAL OF NUCLEAR MATERIALS 385, 299 (2009)

Rasch JCE, Boehm M, Ritter C, Mutka H, Schefer J, Keller L, Abramova GM, Cervellino A, Loeffler JF
Magnetoelastic coupling in the triangular lattice antiferromagnet CuCrS2
PHYSICAL REVIEW B 80, 104431 (2009)

Rasch JCE, Sheptyakov DV, Schefer J, Keller L, Boehm M, Gozzo F, Volkov NV, Sablina KA, Petrakovskii GA, Grimmer H, Conder K, Loffler JF
Structural properties of Pb3Mn7O15 determined from high-resolution synchrotron powder diffraction
JOURNAL OF SOLID STATE CHEMISTRY 182, 1188 (2009)

Reichold J, Stampanoni M, Keller AL, Buck A, Jenny P, Weber B
Cerebral blood flow simulation using a vascular graph model
JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM 29, S115 (2009)

Reichold J, Stampanoni M, Keller AL, Buck A, Jenny P, Weber B
Vascular graph model to simulate the cerebral blood flow in realistic vascular networks
JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM 29, 1429 (2009)

Rouff AA, Rabe S, Nachtegaal M, Vogel F
X-ray Absorption Fine Structure Study of the Effect of Protonation on Disorder and Multiple Scattering in Phosphate Solutions and Solids
JOURNAL OF PHYSICAL CHEMISTRY A 113, 6895 (2009)

Ruffieux P, Ait-Mansour K, Bendounan A, Fasel R, Patthey L, Gröning P, Gröning O
Mapping the Electronic Surface Potential of Nanostructured Surfaces
PHYSICAL REVIEW LETTERS 102, 086807 (2009)

Russo S, Schweitzer JE, Polen T, Bott M, Pohl E
Crystal Structure of the Caseinolytic Protease Gene Regulator, a Transcriptional Activator in Actinomycetes
JOURNAL OF BIOLOGICAL CHEMISTRY 284, 5208 (2009)

Sahoo PK, Vogelsang K, Schift H, Solak HH
Surface plasmon resonance in near-field coupled gold cylinder arrays fabricated by EUV-interference lithography and hot embossing
APPLIED SURFACE SCIENCE 256, 431 (2009)

Sarkar SS, Sahoo PK, Solak HH, David C, van der Veen JF
Fresnel zone plates made by holography in the extreme ultraviolet re- gion
JOURNAL OF PHYSICS: CONFERENCE SERIES 186, 012017 (2009)

Satapathy DK, Nygard K, Bunk O, Jefimovs K, Perret E, Diaz A, Pfeiffer F, David C, van der Veen JF
Buckling and layering transitions in confined colloids
EPL 87, 34001 (2009)

Scheybal A, Muller K, Bertschinger R, Wahl M, Bendounan A, Aebi P, Jung TA
Modification of the Cu(110) Shockley surface state by an adsorbed pentacene monolayer
PHYSICAL REVIEW B 79, 115406 (2009)

Schift H, Spreu C, Saidani M, Bednarzik M, Gobrecht J, Klukowska A, Reuther F, Gruetzner G, H Solak H
Transparent hybrid polymer stamp copies with sub-50 nm resolution for thermal and UV-nanoimprint lithography
JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B 27(6), 2846 (2009)

Schlappa J, Schmitt T, Vernay F, Strocov VN, Ilakovac V, Thielemann B, Ronnow HM, Vanishri S, Piazzalunga A, Wang X, Braicovich L, Ghiringhelli G, Marin C, Mesot J, Delley B, Patthey L
Collective Magnetic Excitations in the Spin Ladder $Sr_{14}Cu_{24}O_{41}$ *Measured Using High-Resolution Resonant Inelastic X-Ray Scattering*
PHYSICAL REVIEW LETTERS 103, 047401 (2009)

Schmidt MU, Bruhne S, Wolf AK, Rech A, Bruning J, Alig E, Fink L, Buchsbaum C, Glinnemann J, van de Streek J, Gozzo F, Brunelli M, Stowasser F, Gorelik T, Mugnaioli E, Kolb U
Electron diffraction, X-ray powder diffraction and pair-distribution-function analyses to determine the crystal structure of Pigment Yellow 213, C23H21N5O9
ACTA CRYSTALLOGRAPHICA SECTION B-STRUCTURAL SCIENCE 65, 189 (2009)

Schneider P, Krucker T, Meyer E, Ulmann-Schuler A, Weber B, Stampanoni M, Muller R
Simultaneous 3D Visualization and Quantification of Murine Bone and Bone Vasculature Using Micro-Computed Tomography and Vascular Replica
MICROSCOPY RESEARCH AND TECHNIQUE 72, 690 (2009)

Schneider P, Voide R, Stampanoni M, Muller R
Post-processing technique for improved assessment of hard tissues in the submicrometer domain using local synchrotron radiation-based computed tomography
BIOMEDIZINISCHE TECHNIK 54, 48 (2009)

Scott AC, Galtier J, Gostling NJ, Smith SY, Collinson ME, Stampanoni M, Marone F, Donoghue PCJ, Bengtson S
Scanning Electron Microscopy and Synchrotron Radiation X-Ray Tomographic Microscopy of 330 Million Year Old Charcoalified Seed Fern Fertile Organs
MICROSCOPY AND MICROANALYSIS 15, 166 (2009)

Shi M, Bendounan A, Razzoli E, Rosenkranz S, Norman MR, Campuzano JC, Chang J, Mansson M, Sassa Y, Claesson T, Tjernberg O, Patthey L, Momono N, Oda M, Ido M, Guerrero S, Mudry C, Mesot J
Spectroscopic evidence for preformed Cooper pairs in the pseudogap phase of cuprates
EPL 88, 27008 (2009)

Smith SY, Collinson ME, Rudall PJ, Simpson DA, Marone F, Stampanoni M
Virtual taphonomy using synchrotron tomographic microscopy reveals cryptic features and internal structure of modern and fossil plants
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 12013 (2009)

Smith SY, Collinson ME, Simpson DA, Rudall PJ, Marone F, Stampanoni M
Elucidating the affinities and habitat of ancient, widespread Cyperaceae: Volkeria messelensis gen. et sp. nov., a fossil mapanioid sedge from the Eocene of Europe
AMERICAN JOURNAL OF BOTANY 96, 1506 (2009)

Sobott BA, Broennimann C, Eikenberry EF, Dinapoli R, Kraft P, Taylor GN, Willmott PR, Schleputz CM, Rassool RP
Synchrotron radiation hardness studies of PILATUS II
JOURNAL OF SYNCHROTRON RADIATION 16, 489 (2009)

Stampanoni M, Marone F, Mikuljan G, Jefimovs K, Trtik P, Vila-Comamala J, David C, Abela R
Broadband X-ray full field microscopy at a superbend
JOURNAL OF PHYSICS: CONFERENCE SERIES 186, 012018 (2009)

Staub U, Bodenthin Y, Piamonteze C, Garcia-Fernandez M, Scagnoli V, Garganourakis M, Koohpayeh S, Fort D, Lovesey SW
Parity- and time-odd atomic multipoles in magnetoelectric GaFeO3 as seen via soft x-ray Bragg diffraction
PHYSICAL REVIEW B 80, 140410 (2009)

Staub U, Garcia-Fernandez M, Bodenthin Y, Scagnoli V, De Souza RA, Garganourakis M, Pomjakushina E, Conder K
Orbital and magnetic ordering in Pr1-xCaxMnO3 and Nd1-xSrxMnO3 manganites near half doping studied by resonant soft x-ray powder diffraction
PHYSICAL REVIEW B 79, 224419 (2009)

Stoetzel J, Luetzenkirchen-Hecht D, Frahm R, Kimmerle B, Baiker A, Nachtegaal M, Beier M J, Grunwaldt J-D
Investigation of the ignition behaviour of the noble metal catalyzed catalytic partial oxidation of methane
JOURNAL OF PHYSICS: CONFERENCE SERIES 190, 012162 (2009)

Stoetzel J, Luetzenkirchen-Hecht D, Frahm R, Kimmerle B, Baiker A, Nachtegaal M, Beier M J, Grunwaldt J-D
Reduction and re-oxidation of Cu/Al2O3 catalysts investigated with quick-scanning XANES and EXAFS
JOURNAL OF PHYSICS: CONFERENCE SERIES 190, 012153 (2009)

Struis RPWJ, Schildhauer TJ, Czekaj I, Janousch M, Biollaz SMA, Ludwig C
Sulphur poisoning of Ni catalysts in the SNG production from biomass: A TPO/XPS/XAS study
APPLIED CATALYSIS A-GENERAL 362, 121 (2009)

Thibault P, Dierolf M, Bunk O, Menzel A, Pfeiffer F
Probe retrieval in ptychographic coherent diffractive imaging
ULTRAMICROSCOPY 109, 338 (2009)

Thibault P, Dierolf M, Kewish CM, Menzel A, Bunk O, Pfeiffer F
Contrast mechanisms in scanning transmission x-ray microscopy
PHYSICAL REVIEW A 80, 043813 (2009)

Thilly L, Van Petegem S, Renault PO, Lecouturier F, Vidal V, Schmitt B, Van Swygenhoven H
A new criterion for elasto-plastic transition in nanomaterials: Application to size and composite effects on Cu-Nb nanocomposite wires
ACTA MATERIALIA 57, 3157 (2009)

Treier M, Ruffieux P, Fasel R, Nolting F, Yang SF, Dunsch L, Greber T
Looking inside an endohedral fullerene: Inter- and intramolecular ordering of $Dy_3N@C_{80}(I_h)$ *on Cu(111)*
PHYSICAL REVIEW B 80, 081403 (2009)

Tsujino S, le Pimpec F, Raabe J, Buess M, Dehler M, Kirk E, Gobrecht J, Wrulich A
Static and optical field enhancement in metallic nanotips studied by two-photon photoemission microscopy and spectroscopy excited by picosecond laser pulses
APPLIED PHYSICS LETTERS 94, 093508 (2009)

Tzvetkov G, Fernandes P, Wenzel S, Fery A, Paradossi G, Fink RH
Soft X-ray induced modifications of PVA-based microbubbles in aqueous environment: a microspectroscopy study
PHYSICAL CHEMISTRY CHEMICAL PHYSICS 11, 1098 (2009)

Ulrich C, J P Ament L, Ghiringhelli G, Braicovich L, Moretti Sala M, Pezzotta N, Schmitt T, Khaliullin G, van den Brink J, Roth H, Lorenz T, Keimer B
Momentum Dependence of Orbital Excitations in Mott-Insulating Titanates
PHYSICAL REVIEW LETTERS 103, 107205 (2009)

van der Veen RM, Bressler C, Milne CJ, Pham V-T, El Nahhas A, Lima FA, Gawelda W, Borca CN, Abela R, Chergui M
Retrieving photochemically active structures by time-resolved EXAFS spectroscopy
JOURNAL OF PHYSICS: CONFERENCE SERIES 190, 012054 (2009)

van der Veen RM, Milne CJ, El Nahhas A, Lima FA, Pham VT, Best J, Weinstein JA, Borca CN, Abela R, Bressler C, Chergui M
Structural Determination of a Photochemically Active Diplatinum Molecule by Time-Resolved EXAFS Spectroscopy
ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 48, 2711 (2009)

Van Petegem S, Brandstetter S, Maass R, Hodge AM, El-Dasher BS, Biener J, Schmitt B, Borca C, Van Swygenhoven H
On the Microstructure of Nanoporous Gold: An X-ray Diffraction Study
NANO LETTERS 9, 1158 (2009)

Van Petegem S, Brandstetter S, Schmitt B, Van Swygenhoven H
Creep in nanocrystalline Ni during X-ray diffraction
SCRIPTA MATERIALIA 60, 297 (2009)

Vernooij MGC, Mohr M, Tzvetkov G, Zelenay V, Huthwelker T, Kaegi R, Gehrig R, Grobety B
On Source Identification and Alteration of Single Diesel and Wood Smoke Soot Particles in the Atmosphere; An X-Ray Microspectroscopy Study
ENVIRONMENTAL SCIENCE & TECHNOLOGY 43, 5339 (2009)

Vila-Comamala J, Jefimovs K, Pilvi T, Ritala M, Sarkar SS, Solak HH, Guzenko VA, Stampanoni M, Marone F, Raabe J, Tzvetkov G, Fink RH, Grolimund D, Borca CN, Kaulich B, David C
Advanced X-ray diffractive optics
JOURNAL OF PHYSICS: CONFERENCE SERIES 186, 012078 (2009)

Vila-Comamala J, Jefimovs K, Raabe J, Pilvi T, Fink RH, Senoner M, Maassdorf A, Ritala M, David C
Advanced thin film technology for ultrahigh resolution X-ray microscopy
ULTRAMICROSCOPY 109, 1360 (2009)

Voide R, Schneider P, Stauber M, Wyss R, Stampanoni M, Sennhauser U, van Lenthe GH, Muller R
Time-lapsed assessment of microcrack initiation and propagation in murine cortical bone at submicrometer resolution
BONE 45, 164 (2009)

Vorobeva E, Johnson SL, Beaud P, Milne CJ, Benfatto M, Ingold G
Local structural changes in excited Ti3+:Al2O3 studied by time-resolved XANES
PHYSICAL REVIEW B 80, 134301 (2009)

Vyalikh DV, Danzenbacher S, Kucherenko Y, Krellner C, Geibel C, Laubschat C, Shi M, Patthey L, Follath R, Molodtsov SL
Tuning the Hybridization at the Surface of a Heavy-Fermion System
PHYSICAL REVIEW LETTERS 103, 137601 (2009)

Wagner A, Diez J, Schulze-Briese C, Schluckebier G
Crystal structure of Ultralente-A microcrystalline insulin suspension
PROTEINS-STRUCTURE FUNCTION AND BIOINFORMATICS 74, 1018 (2009)

Wells JW, Dil JH, Meier F, Lobo-Checa J, Petrov VN, Osterwalder J, Ugeda MM, Fernandez-Torrente I, Pascual JI, Rienks EDL, Jensen MF, Hofmann P
Nondegenerate Metallic States on Bi(114): A One-Dimensional Topological Metal
PHYSICAL REVIEW LETTERS 102, 096802 (2009)

Westermeier F, Autenrieth T, Gutt C, Leupold O, Duri A, Menzel A, Johnson I, Broennimann C, Grubel G
Fast two-dimensional detection for X-ray photon correlation spectroscopy using the PILATUS detector
JOURNAL OF SYNCHROTRON RADIATION 16, 687 (2009)

Wu MS, Wang MT, Nix J, Hryshko LV, Zheng L
Crystal Structure of CBD2 from the Drosophila Na+/Ca2+ Exchanger: Diversity of Ca2+ Regulation and Its Alternative Splicing Modification
JOURNAL OF MOLECULAR BIOLOGY 387, 104 (2009)

Yang L, Hill M, Wang M, Panjikar S, Stoeckigt J
Structural Basis and Enzymatic Mechanism of the Biosynthesis of C9- from C10-Monoterpenoid Indole Alkaloids
ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 48, 5211 (2009)

Zhou KJ, Tezuka Y, Cui MQ, Zhao J, Liu XC, Chen ZZ, Wu ZY
The mechanism of Al donor defects in (Zn, Co)O:Al: a view from resonant x-ray spectroscopies
JOURNAL OF PHYSICS-CONDENSED MATTER 21, 495502 (2009)

PUBLICATIONS WITHOUT SYN AUTHOR(S) AND DESCRIBING AN SLS EXPERIMENT

Aldag C, Gromov IA, Garcia-Rubio I, von Koenig K, Schlichting I, Jaun B, Hilvert D
Probing the role of the proximal heme ligand in cytochrome P450cam by recombinant incorporation of selenocysteine
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 5481 (2009)

Auernhammer GK, Fauth K, Ullrich B, Zhao J, Weigand M, Vollmer D
Time-resolved X-ray microscopy of nanoparticle aggregates under oscillatory shear
JOURNAL OF SYNCHROTRON RADIATION 16, 307 (2009)

Austermann J, Nazmi AR, Heil A, Fritz G, Kolinski M, Filipek S, Gerke V
Generation and characterization of a novel, permanently active S100P mutant
BIOCHIMICA ET BIOPHYSICA ACTA-MOLECULAR CELL RESEARCH 1793, 1078 (2009)

Bailly M, Blaise M, Lorber B, Thirup S, Kern D
Isolation, crystallization and preliminary X-ray analysis of the transamidosome, a ribonucleoprotein involved in asparagine formation
ACTA CRYSTALLOGRAPHICA SECTION F-STRUCTURAL BIOLOGY AND CRYSTALLIZATION COMMUNICATIONS 65, 577 (2009)

Barends TRM, Hartmann E, Griese JJ, Beitlich T, Kirienko NV, Ryjenkov DA, Reinstein J, Shoeman RL, Gomelsky M, Schlichting I
Structure and mechanism of a bacterial light-regulated cyclic nucleotide phosphodiesterase
NATURE 459, 1015 (2009)

Baron R, Riley C, Chenprakhon P, Thotsaporn K, Winter RT, Alfieri A, Forneris F, van Berkel WJH, Chaiyen P, Fraaije MW, Mattevi A, McCammon JA
Multiple pathways guide oxygen diffusion into flavoenzyme active sites
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 10603 (2009)

Beier MJ, Hansen TW, Grunwaldt JD
Selective liquid-phase oxidation of alcohols catalyzed by a silver-based catalyst promoted by the presence of ceria
JOURNAL OF CATALYSIS 266, 320 (2009)

Bengtson S, Belivanova V, Rasmussen B, Whitehouse M
The controversial "Cambrian" fossils of the Vindhyan are real but more than a billion years older
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 7729 (2009)

Binter A, Staunig N, Jelesarov I, Lohner K, Palfey BA, Deller S, Gruber K, Macheroux P
A single intersubunit salt bridge affects oligomerization and catalytic activity in a bacterial quinone reductase
FEBS JOURNAL 276, 5263 (2009)

Bocquet N, Nury H, Baaden M, Le Poupon C, Changeux JP, Delarue M, Corringer PJ
X-Ray structure of a pentameric ligand-gated ion channel in an apparently open conformation
NATURE 457, 111 (2009)

Boeggild A, Overgaard M, Valentin-Hansen P, Brodersen DE
Cyanobacteria contain a structural homologue of the Hfq protein with altered RNA-binding properties
FEBS JOURNAL 276(14), 3904 (2009)

Bonneau F, Basquin J, Ebert J, Lorentzen E, Conti E
The Yeast Exosome Functions as a Macromolecular Cage to Channel RNA Substrates for Degradation
CELL 139, 547 (2009)

Botelho HM, Koch M, Fritz G, Gomes CM
Metal ions modulate the folding and stability of the tumor suppressor protein S100A2
FEBS JOURNAL 276, 1776 (2009)

Brosig A, Nesper J, Boos W, Welte W, Diederichs K
Crystal Structure of a Major Outer Membrane Protein from Thermus thermophilus HB27
JOURNAL OF MOLECULAR BIOLOGY 385, 1445 (2009)

Brueckner F, Armache KJ, Cheung A, Damsma GE, Kettenberger H, Lehmann E, Sydow J, Cramer P
Structure-function studies of the RNA polymerase II elongation complex
ACTA CRYSTALLOGRAPHICA SECTION D-BIOLOGICAL CRYSTALLOGRAPHY 65, 112 (2009)

Brueckner F, Ortiz J, Cramer P
A movie of the RNA polymerase nucleotide addition cycle
CURRENT OPINION IN STRUCTURAL BIOLOGY 19, 294 (2009)

Cammelli S, Degueldre C, Kuri G, Bertsch J, Luetzenkirchen-Hecht D, Frahm R
Study of atomic clusters in neutron irradiated reactor pressure vessel surveillance samples by extended x-ray absorption fine structure spectroscopy
JOURNAL OF NUCLEAR MATERIALS 385, 319 (2009)

Ceh K, Demmer U, Warkentin E, Moll J, Thauer RK, Shima S, Ermler U
Structural Basis of the Hydride Transfer Mechanism in F-420-Dependent Methylenetetrahydromethanopterin Dehydrogenase
BIOCHEMISTRY 48, 10098 (2009)

Celie PHN, Toebes M, Rodenko B, Ovaa H, Perrakis A, Schumacher TNM
UV-Induced Ligand Exchange in MHC Class I Protein Crystals
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 131, 12298 (2009)

Cerny R, Filinchuk Y, Bruhne S
Local atomic order in the vicinity of Cu-2 dumbbells in TbCu7-type YCu6.576 studied by Bragg and total scattering techniques
INTERMETALLICS 17, 818 (2009)

Chergui M, Zewail AH
Electron and X-Ray Methods of Ultrafast Structural Dynamics: Advances and Applications
CHEMPHYSCHEM 10, 28 (2009)

Claren J, Malisi C, Hocker B, Sterner R
Establishing wild-type levels of catalytic activity on natural and artificial (beta alpha)(8)-barrel protein scaffolds
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 3704 (2009)

Clerc J, Groll M, Illich DJ, Bachmann AS, Huber R, Schellenberg B, Dudler R, Kaiser M
Synthetic and structural studies on syringolin A and B reveal critical determinants of selectivity and potency of proteasome inhibition
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 6507 (2009)

Conti E, Bonneau F, Ebert J, Basquin J, Lorentzen E
Molecular mechanisms of RNA degradation by the exosome
FEBS JOURNAL 276, 37 (2009)

Cook AG, Fukuhara N, Jinek M, Conti E
Structures of the tRNA export factor in the nuclear and cytosolic states
NATURE 461, 60 (2009)

Cramer P, Arnold E
Proteins: how RNA polymerases work Editorial overview
CURRENT OPINION IN STRUCTURAL BIOLOGY 19, 680 (2009)

Cramer P, Arnold E
Proteins: how RNA polymerases work Editorial overview
CURRENT OPINION IN STRUCTURAL BIOLOGY 19, 680 (2009)

Curti E, Daehn R, Farges F, Vespa M
Na, Mg, Ni and Cs distribution and speciation after long-term alteration of a simulated nuclear waste glass: A micro-XAS/XRF/XRD and wet chemical study
GEOCHIMICA ET COSMOCHIMICA ACTA 73, 2283 (2009)

Damsma GE, Cramer P
Molecular Basis of Transcriptional Mutagenesis at 8-Oxoguanine
JOURNAL OF BIOLOGICAL CHEMISTRY 284, 31658 (2009)

De Ligny D, Neuville DR, Cormier L, Roux J, Henderson GS, Panczer G, Shoval S, Flank AM, Lagarde P
Silica polymorphs, glass and melt: An in situ high temperature XAS study at the Si K-edge
JOURNAL OF NON-CRYSTALLINE SOLIDS 355, 1099 (2009)

De Marco V, Gillespie PJ, Li A, Karantzelis N, Christodoulou E, Klompmaker R, van Gerwen S, Fish A, Petoukhov MV, Iliou MS, Lygerou Z, Medema RH, Blow JJ, Svergun DI, Taraviras S, Perrakis A
Quaternary structure of the human Cdt1-Geminin complex regulates DNA replication licensing
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 19807 (2009)

Dengl S, Cramer P
Torpedo Nuclease Rat1 Is Insufficient to Terminate RNA Polymerase II in Vitro
JOURNAL OF BIOLOGICAL CHEMISTRY 284, 21270 (2009)

Dengl S, Mayer A, Sun M, Cramer P
Structure and in Vivo Requirement of the Yeast Spt6 SH2 Domain
JOURNAL OF MOLECULAR BIOLOGY 389, 211 (2009)

Djuranovic S, Hartmann MD, Habeck M, Ursinus A, Zwickl P, Martin J, Lupas AN, Zeth K
Structure and Activity of the N-Terminal Substrate Recognition Domains in Proteasomal ATPases
MOLECULAR CELL 34, 580 (2009)

Donat S, Streker K, Schirmeister T, Rakette S, Stehle T, Liebeke M, Lalk M, Ohlsen K
Transcriptome and Functional Analysis of the Eukaryotic-Type Serine/Threonine Kinase PknB in Staphylococcus aureus
JOURNAL OF BACTERIOLOGY 191, 4056 (2009)

Dreveny I, Andryushkova AS, Glieder A, Gruber K, Kratky C
Substrate Binding in the FAD-Dependent Hydroxynitrile Lyase from Almond Provides Insight into the Mechanism of Cyanohydrin Formation and Explains the Absence of Dehydrogenation Activity
BIOCHEMISTRY 48, 3370 (2009)

Edmondson DE, Binda C, Wang J, Upadhyay AK, Mattevi A
Molecular and Mechanistic Properties of the Membrane-Bound Mitochondrial Monoamine Oxidases
BIOCHEMISTRY 48, 4220 (2009)

Eicher T, Brandstatter L, Pos KM
Structural and functional aspects of the multidrug efflux pump AcrB
BIOLOGICAL CHEMISTRY 390, 693 (2009)

Filinchuk Y, Cerny R, Hagemann H
Insight into Mg(BH4)(2) with Synchrotron X-ray Diffraction: Structure Revision, Crystal Chemistry, and Anomalous Thermal Expansion
CHEMISTRY OF MATERIALS 21, 925 (2009)

Fraas S, Steinbach AK, Tabbert A, Harder J, Ermler U, Tittmann K, Meyer A, Kroneck PMH
Cyclohexane-1,2-dione hydrolase: A new tool to degrade alicyclic compounds
JOURNAL OF MOLECULAR CATALYSIS B-ENZYMATIC 61, 47 (2009)

Frank S, Handge UA, Olliges S, Spolenak R
Mechanical Failure of Thin Ta and Cu/Ta Layers on Polyimide Substrates: A Synchrotron-Based Technique for In Situ Characterization
AIP CONFERENCE PROCEEDINGS 1143, 104 (2009)

Frank S, Handge UA, Olliges S, Spolenak R
The relationship between thin film fragmentation and buckle formation: Synchrotron-based in situ studies and two-dimensional stress analysis
ACTA MATERIALIA 57, 1442 (2009)

Friis EM, Pedersen KR, Crane PR
Early Cretaceous mesofossils from Portugal and eastern North America related to the Bennettitales-Erdtmanithecales-Gnetales group
AMERICAN JOURNAL OF BOTANY 96, 252 (2009)

Friis EM, Pedersen KR, von Balthazar M, Grimm GW, Crane PR
Monetianthus mirus gen. et sp. nov., a Nymphaealean Flower from the Early Cretaceous of Portugal
INTERNATIONAL JOURNAL OF PLANT SCIENCES 170, 1086 (2009)

Fritz G
Insights into the function of S100B from structural and spectroscopic studies
AMINO ACIDS 37, 76 (2009)

Gallastegui N, Groll M
How ATPases Unravel a Mystery
STRUCTURE 17, 1279 (2009)

Glas AF, Schneider S, Maul MJ, Hennecke U, Carell T
Crystal Structure of the T(6-4)C Lesion in Complex with a (6-4) DNA Photolyase and Repair of UV-Induced (6-4) and Dewar Photolesions
CHEMISTRY-A EUROPEAN JOURNAL 15, 10387 (2009)

Glasspool IJ, Collinson ME, Scott AC, Brain APR, Plotnick RE, Kenig F
An ultrastructural investigation of early Middle Pennsylvanian megaspores from the Illinois Basin, USA
REVIEW OF PALAEOBOTANY AND PALYNOLOGY 156, 62 (2009)

Goetz BA, Perozo E, Locher KP
Distinct gate conformations of the ABC transporter BtuCD revealed by electron spin resonance spectroscopy and chemical cross-linking
FEBS LETTERS 583, 266 (2009)

Gratier JP, Guiguet R, Renard F, Jenatton L, Bernard D
A pressure solution creep law for quartz from indentation experiments
JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH 114, B03403 (2009)

Grawert T, Rohdich F, Span I, Bacher A, Eisenreich W, Eppinger J, Groll M
Structure of Active IspH Enzyme from Escherichia coli Provides Mechanistic Insights into Substrate Reduction
ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 48, 5756 (2009)

Groll M, McArthur KA, Macherla VR, Manam RR, Potts BC
Snapshots of the Fluorosalinosporamide/20S Complex Offer Mechanistic Insights for Fine Tuning Proteasome Inhibition
JOURNAL OF MEDICINAL CHEMISTRY 52, 5420 (2009)

Gruber K, Arruda GB, Baral PK, Deller S, Macheroux P, Jajcanin-Jozic N, Abramic M
3D-Structure of dipeptidyl-peptidase III (DPP III)
NEUROPEPTIDES 43, 444 (2009)

Gut H, Dominici P, Pilati S, Astegno A, Petoukhov MV, Svergun DI, Grutter MG, Capitani G
A Common Structural Basis for pH- and Calmodulin-mediated Regulation in Plant Glutamate Decarboxylase
JOURNAL OF MOLECULAR BIOLOGY 392, 334 (2009)

Hannemann S, Grunwaldt JD, Kimmerle B, Baiker A, Boye P, Schroer C
Axial Changes of Catalyst Structure and Temperature in a Fixed-Bed Microreactor During Noble Metal Catalysed Partial Oxidation of Methane
TOPICS IN CATALYSIS 52, 1360 (2009)

Hartmann MD, Ridderbusch O, Zeth K, Albrecht R, Testa O, Woolfson DN, Sauer G, Dunin-Horkawicz S, Lupas AN, Alvarez BH
A coiled-coil motif that sequesters ions to the hydrophobic core
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 16950 (2009)

Henkel A, Schubert O, Plech A, Soennichsen C
Growth Kinetic of a Rod-Shaped Metal Nanocrystal
JOURNAL OF PHYSICAL CHEMISTRY C 113, 10390 (2009)

Hennig S, Strauss HM, Vanselow K, Yildiz O, Schulze S, Arens J, Kramer A, Wolf E
Structural and Functional Analyses of PAS Domain Interactions of the Clock Proteins Drosophila PERIOD and Mouse PERIOD2
PLOS BIOLOGY 7, 836 (2009)

Hilf RJC, Dutzler R
Structure of a potentially open state of a proton-activated pentameric ligand-gated ion channel
NATURE 457, 115 (2009)

Hiromoto T, Ataka K, Pilak O, Vogt S, S Stagni M, Meyer-Klaucke W, Warkentin E, K Thauer R, Shima S, Ermler U
The crystal structure of C176A mutated [Fe]-hydrogenase suggests an acyl- iron ligation in the active site iron complex
FEBS LETTERS 583, 585 (2009)

Hiromoto T, Warkentin E, Moll J, Ermler U, Shima S
The Crystal Structure of an [Fe]-Hydrogenase-Substrate Complex Reveals the Framework for H2 Activation
ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 48, 6457 (2009)

Hocker B, Lochner A, Seitz T, Claren J, Sterner R
High-Resolution Crystal Structure of an Artificial (beta alpha)(8)-Barrel Protein Designed from Identical Half-Barrels
BIOCHEMISTRY 48, 1145 (2009)

Hollenstein K, Comellas-Bigler M, Bevers LE, Feiters MC, Meyer-Klaucke W, Hagedoorn PL, Locher KP
Distorted octahedral coordination of tungstate in a subfamily of specific binding proteins
JOURNAL OF BIOLOGICAL INORGANIC CHEMISTRY 14, 663 (2009)

Honnappa S, Gouveia SM, Weisbrich A, Damberger FF, Bhavesh NS, Jawhari H, Grigoriev I, van Rijssel FJA, Buey RM, Lawera A, Jelesarov I, Winkler FK, Wuthrich K, Akhmanova A, Steinmetz MO
An EB1-Binding Motif Acts as a Microtubule Tip Localization Signal
CELL 138, 366 (2009)

Hung AW, Silvestre HL, Wen SJ, Ciulli A, Blundell TL, Abell C
Application of Fragment Growing and Fragment Linking to the Discovery of Inhibitors of Mycobacterium tuberculosis Pantothenate Synthetase
ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 48, 8452 (2009)

Ivanova MI, Sievers SA, Sawaya MR, Wall JS, Eisenberg D
Molecular basis for insulin fibril assembly
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106(45), 18990 (2009)

Jenni S, Ban N
Imperfect pseudo-merohedral twinning in crystals of fungal fatty acid synthase
ACTA CRYSTALLOGRAPHICA SECTION D-BIOLOGICAL CRYSTALLOGRAPHY 65, 101 (2009)

Journel L, El Khoury L, Marin T, Guillemin R, Carniato S, Avila A, Delaunay R, Hague CF, Simon M
Performances of a bent-crystal spectrometer adapted to resonant x-ray emission measurements on gas-phase samples
REVIEW OF SCIENTIFIC INSTRUMENTS 80, 093105 (2009)

Khazina E, Weichenrieder O
Non-LTR retrotransposons encode noncanonical RRM domains in their first open reading frame
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 731 (2009)

Khouchaf L, Hamoudi A, Cordier P
Evidence of depolymerisation of amorphous silica at medium- and short-range order: XANES, NMR and CP-SEM contributions
JOURNAL OF HAZARDOUS MATERIALS 168, 1188 (2009)

Khunrae P, M D Philip J, R Bull D, K Higgins M
Structural comparison of two CSPG-binding DBL domains from the VAR2CSA protein important in malaria during pregnancy
JOURNAL OF MOLECULAR BIOLOGY 393, 202 (2009)

Klein M, Menzel D, Doll K, Neef M, Zur D, Jursic I, Schoenes J, Reinert F
Photoemission spectroscopy across the semiconductor-to-metal transition in FeSi
NEW JOURNAL OF PHYSICS 11, 023026 (2009)

Klostermeier D, Rudolph MG

A novel dimerization motif in the C-terminal domain of the Thermus thermophilus DEAD box helicase Hera confers substantial flexibility
NUCLEIC ACIDS RESEARCH 37, 421 (2009)

Koepke J, Olkhova E, Angerer H, Mueller H, Peng G, Michel H
High resolution crystal structure of Paracoccus denitrificans cytochrome c oxidase: New insights into the active site and the proton transfer pathways
BIOCHIMICA ET BIOPHYSICA ACTA-BIOENERGETICS 1787, 635 (2009)

Komarova Y, De Groot CO, Grigoriev I, Gouveia SM, Munteanu EL, Schober JM, Honnappa S, Buey RM, Hoogenraad CC, Dogterom M, Borisy GG, Steinmetz MO, Akhmanova A
Mammalian end binding proteins control persistent microtubule growth
JOURNAL OF CELL BIOLOGY 184, 691 (2009)

Koschubs T, Seizl M, Lariviere L, Kurth F, Baumli S, Martin DE, Cramer P
Identification, structure, and functional requirement of the Mediator submodule Med7N/31
EMBO JOURNAL 28, 69 (2009)

Koster S, Wehner M, Herrmann C, Kulhlbrandt W, Yildiz O
Structure and Function of the FeoB G-Domain from Methanococcus jannaschii
JOURNAL OF MOLECULAR BIOLOGY 392, 405 (2009)

Kostrewa D, Zeller ME, Armache KJ, Seizl M, Leike K, Thomm M, Cramer P
RNA polymerase II-TFIIB structure and mechanism of transcription initiation
NATURE 462, 323 (2009)

Koziej D, Hubner M, Barsan N, Weimar U, Sikora M, Grunwaldt JD
Operando X-ray absorption spectroscopy studies on Pd-SnO2 based sensors
PHYSICAL CHEMISTRY CHEMICAL PHYSICS 11, 8620 (2009)

Krieg S, Huche F, Diederichs K, Izadi-Pruneyre N, Lecroisey A, Wandersman C, Delepelaire P, Welte W
Heme uptake across the outer membrane as revealed by crystal structures of the receptor-hemophore complex
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 1045 (2009)

Krummel DAP, Oubridge C, Leung AKW, Li J, Nagai K
Crystal structure of human spliceosomal U1 snRNP at 5.5 angstrom resolution
NATURE 458, 475 (2009)

Kumar M, Jagtap DD, Mahale SD, Prashar V, Kumar A, Das A, Bihani SC, Ferrer JL, Hosur MV, Ramanadham M
Crystallization and preliminary X-ray diffraction analysis of human seminal plasma protein PSP94
ACTA CRYSTALLOGRAPHICA SECTION F-STRUCTURAL BIOLOGY AND CRYSTALLIZATION COMMUNICATIONS 65, 389 (2009)

Kuri G, Cammelli S, Degueldre C, Bertsch J, Gavillet D
Neutron induced damage in reactor pressure vessel steel: An X-ray absorption
JOURNAL OF NUCLEAR MATERIALS 385, 312 (2009)

Lareida A, Beckmann F, Schrott-Fischer A, Glueckert R, Freysinger W, Muller B
High-resolution X-ray tomography of the human inner ear: synchrotron radiation-based study of nerve fibre bundles, membranes and ganglion cells
JOURNAL OF MICROSCOPY-OXFORD 234, 95 (2009)

Laursen M, Bublitz M, Moncoq K, Olesen C, Moller JV, Young HS, Nissen P, Morth JP
Cyclopiazonic acid is complexed to a divalent metal ion when bound to the sarcoplasmic reticulum Ca2+- ATPase
JOURNAL OF BIOLOGICAL CHEMISTRY 284, 13513 (2009)

Leclerc E, Fritz G, Vetter SW, Heizmann CW
Binding of S100 proteins to RAGE: An update
BIOCHIMICA ET BIOPHYSICA ACTA-MOLECULAR CELL RESEARCH 1793, 993 (2009)

Li XD, Huergo LF, Gasperina A, Pedrosa FO, Merrick M, Winkler FK
Crystal structure of dinitrogenase reductase activating glycohydrolase (DRAG) reveals conservation in the ADP-ribosylhydrolase fold and specific features in the ADP-ribose binding pocket

JOURNAL OF MOLECULAR BIOLOGY 390, 737 (2009)

Locher KP
Structure and mechanism of ATP-binding cassette transporters
PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES 364, 239 (2009)

Lorber B, Sauter C, Theobald-Dietrich A, Moreno A, Schellenberger P, Robert MC, Capelle B, Sanglier S, Potier N, Giege R
Crystal growth of proteins, nucleics acids, and viruses in gels
PROGRESS IN BIOPHYSICS & MOLECULAR BIOLOGY 101, 13 (2009)

Maeda S, Nakagawa S, Suga M, Yamashita E, Oshima A, Fujiyoshi Y, Tsukihara T
Structure of the connexin 26 gap junction channel at 3.5 angstrom resolution
NATURE 458, 597 (2009)

Mandaliev P, Dahn R, Wehrli B, Wielandt E
Macro- and Microspectroscopic Study of Nd (III) Uptake Mechanisms in Hardened Cement Paste
ENVIRONMENTAL SCIENCE & TECHNOLOGY 43, 8462 (2009)

Mannini M, Pineider F, Sainctavit P, Danieli C, Otero E, Sciancalepore C, Talarico AM, Arrio MA, Cornia A, Gatteschi D, Sessoli R
Magnetic memory of a single-molecule quantum magnet wired to a gold surface
NATURE MATERIALS 8, 194 (2009)

Marcia M, Ermler U, Peng G, Michel H
The structure of Aquifex aeolicus sulfide:quinone oxidoreductase, a basis to understand sulfide detoxification and respiration
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 9625 (2009)

Masaphy S, Zabari L, Pastrana J, Dultz S
Role of Fungal Mycelium in the Formation of Carbonate Concretions in Growing MediaAn Investigation by SEM and Synchrotron-Based X-Ray Tomographic Microscopy
GEOMICROBIOLOGY JOURNAL 26, 442 (2009)

Meier T, Krah A, Bond PJ, Pogoryelov D, Diederichs K, Faraldo-Gomez JD
Complete Ion-Coordination Structure in the Rotor Ring of Na+-Dependent F-ATP Synthases
JOURNAL OF MOLECULAR BIOLOGY 391, 498 (2009)

Mentel M, Blankenfeldt W, Breinbauer R
The Active Site of an Enzyme Can Host Both Enantiomers of a Racemic Ligand Simultaneously
ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 48, 9084 (2009)

Metzger U, Schall C, Zocher G, Unsold I, Stec E, Li SM, Heide L, Stehle T
The structure of dimethylallyl tryptophan synthase reveals a common architecture of aromatic prenyltransferases in fungi and bacteria
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 14309 (2009)

Meyer S, Bohme S, Kruger A, Steinhoff HJ, Klare JP, Wittinghofer A
Kissing G Domains of MnmE Monitored by X-Ray Crystallography and Pulse Electron Paramagnetic Resonance Spectroscopy
PLOS BIOLOGY 7, e1000212 (2009)

Meyer S, Wittinghofer A, Versees W
G-Domain Dimerization Orchestrates the tRNA Wobble Modification Reaction in the MnmE/GidA Complex
JOURNAL OF MOLECULAR BIOLOGY 392, 910 (2009)

Meyerheim H, Tonnerre J, Sandratskii L, Tolentino H, Przybylski M, Gabi Y, Yildiz F, L Fu X, Bontempi E, Grenier S, Kirschner J
New Model for Magnetism in Ultrathin fcc Fe on Cu(001)
PHYSICAL REVIEW LETTERS 103, 267202 (2009)

Minasov G, Padavattan S, Shuvalova L, Brunzelle JS, Miller DJ, Basle A, Massa C, Collart FR, Schirmer T, Anderson WF
Crystal Structures of YkuI and Its Complex with Second Messenger Cyclic Di-GMP Suggest Catalytic Mechanism of Phosphodiester Bond Cleavage by EAL Domains

JOURNAL OF BIOLOGICAL CHEMISTRY 284, 13174 (2009)

Miot J, Benzerara K, Morin G, Kappler A, Bernard S, Obst M, Ferard C, Skouri-Panet F, Guigner JM, Posth N, Galvez M, Brown Jr GE, Guyot F
Iron biomineralization by neutrophilic iron-oxidizing bacteria
GEOCHIMICA ET COSMOCHIMICA ACTA 73, 696 (2009)

Mueller M, Grauschopf U, Maier T, Glockshuber R, Ban N
The structure of a cytolytic alpha-helical toxin pore reveals its assembly mechanism
NATURE 459, 726 (2009)

Neubauer C, Gao YG, Andersen KR, Dunham CM, Kelley AC, Hentschel J, Gerdes K, Ramakrishnan V, Brodersen DE
The structural basis for mRNA recognition and cleavage by the ribosome-dependent endonuclease RelE
CELL 139(6), 1084 (2009)

Neuville DR, de Ligny D, Cormier L, Henderson GS, Roux J, Flank AM, Lagarde P
The crystal and melt structure of spinel and alumina at high temperature: An in-situ XANES study at the Al and Mg K-edge
GEOCHIMICA ET COSMOCHIMICA ACTA 73, 3410 (2009)

Nicula R, Ishizaki K, Stir M, Catala-Civera J-M, Vaucher S
Microwave energy absorption driven by dynamic structural and magnetization states in Fe85B15 metallic glass ribbons
APPLIED PHYSICS LETTERS 95, 174104 (2009)

Nicula R, Stir M, Ishizaki K, Catala-Civera J-M, Vaucher S
Nanocrystallization of amorphous alloys using microwaves: in situ time-resolved synchrotron radiation studies
JOURNAL OF PHYSICS: CONFERENCE SERIES 144, 012109 (2009)

Nicula R, Stir M, Ishizaki K, Catala-civera JM, Vaucher S
Rapid nanocrystallization of soft-magnetic amorphous alloys using microwave induction heating
SCRIPTA MATERIALIA 60, 120 (2009)

Nyilas RD, Kobas M, Spolenak R
Synchrotron X-ray microdiffraction reveals rotational plastic deformation mechanisms in polycrystalline thin films
ACTA MATERIALIA 57, 3738 (2009)

Ottmann C, Weyand M, Sassa T, Inoue T, Kato N, Wittinghofer A, Oecking C
A Structural Rationale for Selective Stabilization of Anti-tumor Interactions of 14-3-3 proteins by Cotylenin A
JOURNAL OF MOLECULAR BIOLOGY 386, 913 (2009)

Oubridge C, Krummel DAP, Leung AKW, Li J, Nagai K
Interpreting a Low Resolution Map of Human U1 snRNP Using Anomalous Scatterers
STRUCTURE 17, 930 (2009)

Padavattan S, Flicker S, Schirmer T, Madritsch C, Randow S, Reese G, Vieths S, Lupinek C, Ebner C, Valenta R, Markovic-Housley Z
High-Affinity IgE Recognition of a Conformational Epitope of the Major Respiratory Allergen Phl p 2 As Revealed by X-Ray Crystallography
JOURNAL OF IMMUNOLOGY 182, 2141 (2009)

Pena V, Jovin SM, Fabrizio P, Orlowski J, Bujnicki JM, Luhrmann R, Wahl MC
Common Design Principles in the Spliceosomal RNA Helicase Brr2 and in the Hel308 DNA Helicase
MOLECULAR CELL 35, 454 (2009)

Persson BD, Muller S, Reiter DM, Schmitt BBT, Marttila M, Sumowski CV, Schweizer S, Scheu U, Ochsenfeld C, Arnberg N, Stehle T
An Arginine Switch in the Species B Adenovirus Knob Determines High-Affinity Engagement of Cellular Receptor CD46
JOURNAL OF VIROLOGY 83, 673 (2009)

Plech A, Boneberg J, Leiderer P
Femtosecond laser near field ablation
LASER AND PHOTONICS REVIEWS 3, 435 (2009)

Pos KM
Drug transport mechanism of the AcrB efflux pump
BIOCHIMICA ET BIOPHYSICA ACTA-PROTEINS AND PROTEOMICS 1794, 782 (2009)

Pos KM
Trinity revealed: Stoichiometric complex assembly of a bacterial multidrug efflux pump
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 6893 (2009)

Pos KM
Trinity revealed: Stoichiometric complex assembly of a bacterial multidrug efflux pump (vol 106, pg 6893, 2009)
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 9534 (2009)

Querol-Audi J, Casanas A, Uson I, Luque D, Caston JR, Fita I, Verdaguer N
The mechanism of vault opening from the high resolution structure of the N-terminal repeats of MVP
EMBO JOURNAL 28(21), 3450 (2009)

Quick M, Winther AM, Shi L, Nissen P, Weinstein H, Javitch JA
Binding of an octylglucoside detergent molecule in the second substrate (S2) site of LeuT establishes an inhibitor-bound conformation
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 5563 (2009)

Quistgaard EM, Madsen P, Groeftehauge MK, Nissen P, Petersen CM, Thirup SS
Ligands bind to Sortilin in the tunnel of a ten- bladed beta-propeller domain
NATURE STRUCTURAL AND MOLECULAR BIOLOGY 16, 96 (2009)

Radi M, Maga G, Alongi M, Angeli L, Samuele A, Zanoli S, Bellucci L, Tafi A, Casaluce G, Giorgi G, Armand-Ugon M, Gonzalez E, Este JA, Baltzinger M, Bec G, Dumas P, Ennifar E, Botta M
Discovery of Chiral Cyclopropyl Dihydro-Alkylthio-Benzyl-Oxopyrimidine (S-DABO) Derivatives as Potent HIV-1 Reverse Transcriptase Inhibitors with High Activity Against Clinically Relevant Mutants
JOURNAL OF MEDICINAL CHEMISTRY 52, 840 (2009)

Reguer S, Mirambet F, Dooryhee E, Hodeau JL, Dillmann P, Lagarde P
Structural evidence for the desalination of akaganeite in the preservation of iron archaeological objects, using synchrotron X-ray powder diffraction and absorption spectroscopy
CORROSION SCIENCE 51, 2795 (2009)

Repanas K, Fuentes G, Cohen SX, Bonvin AMJJ, Perrakis A
Insights into the DNA cleavage mechanism of human LINE-1 retrotransposon endonuclease
PROTEINS-STRUCTURE FUNCTION AND BIOINFORMATICS 74, 917 (2009)

Ressl S, Terwisscha van Scheltinga AC, Vonrhein C, Ott V, Ziegler C
Molecular basis of transport and regulation in the Na(+)/betaine symporter BetP.
NATURE 458, 47 (2009)

Rodenko B, Toebes M, Celie PHN, Perrakis A, Schumacher TNM, Ovaa H
Class I Major Histocompatibility Complexes Loaded by a Periodate Trigger
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 131, 12305 (2009)

Rose R, Huttenlocher F, Cedzich A, Kaiser M, Schaller A, Ottmann C
Purification, crystallization and preliminary X-ray diffraction analysis of a plant subtilase
ACTA CRYSTALLOGRAPHICA SECTION F-STRUCTURAL BIOLOGY AND CRYSTALLIZATION COMMUNICATIONS 65, 522 (2009)

Roushan P, Seo J, Parker CV, Hor YS, Hsieh D, Qian D, Richardella A, Hasan MZ, Cava RJ, Yazdani A
Topological surface states protected from backscattering by chiral spin texture
NATURE 460, 1106 (2009)

Rudolph MG, Klostermeier D
The Thermus thermophilus DEAD box helicase Hera contains a modified RNA recognition motif domain loosely connected to the helicase core
RNA-A PUBLICATION OF THE RNA SOCIETY 15, 1993 (2009)

Rudolph MG, Wittmann JG, Klostermeier D
Crystallization and preliminary characterization of the Thermus thermophilus RNA helicase Hera C-terminal domain
ACTA CRYSTALLOGRAPHICA SECTION F-STRUCTURAL BIOLOGY AND CRYSTALLIZATION COMMUNICATIONS 65, 248 (2009)

Schoebel S, Oesterlin LK, Blankenfeldt W, Goody RS, Itzen A
RabGDI Displacement by DrrA from Legionella Is a Consequence of Its Guanine Nucleotide Exchange Activity
MOLECULAR CELL 36, 1060 (2009)

Schreier B, Stumpp C, Wiesner S, Hocker B
Computational design of ligand binding is not a solved problem
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 18491 (2009)

Schulte T, Niedzwiedzki DM, Birge RR, Hiller RG, Polivka T, Hofmann E, Frank HA
Identification of a single peridinin sensing Chl-a excitation in reconstituted PCP by crystallography and spectroscopy
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 20764 (2009)

Schulz BL, Stirnimann CU, Grimshaw JPA, Brozzo MS, Fritsch F, Mohorko E, Capitani G, Glockshuber R, Grutter MG, Aebi M
Oxidoreductase activity of oligosaccharyltransferase subunits Ost3p and Ost6p defines site-specific glycosylation efficiency
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 11061 (2009)

Seeger MA, von Ballmoos C, Verrey F, Pos KM
Crucial Role of Asp408 in the Proton Translocation Pathway of Multidrug Transporter AcrB: Evidence from Site-Directed Mutagenesis and Carbodiimide Labeling
BIOCHEMISTRY 48, 5801 (2009)

Sennhauser G, Bukowska MA, Briand C, Grutter MG
Crystal Structure of the Multidrug Exporter MexB from Pseudomonas aeruginosa
JOURNAL OF MOLECULAR BIOLOGY 389, 134 (2009)

Simonetti A, Marzi S, Jenner L, Myasnikov A, Romby P, Yusupova G, Klaholz BP, Yusupov M
A structural view of translation initiation in bacteria
CELLULAR AND MOLECULAR LIFE SCIENCES 66, 423 (2009)

Sirajuddin M, Farkasovsky M, Zent E, Wittinghofer A
GTP-induced conformational changes in septins and implications for function
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 16592 (2009)

Stein A, Weber G, Wahl MC, Jahn R
Helical extension of the neuronal SNARE complex into the membrane
NATURE 460, 525 (2009)

Stir M, Ishizaki K, Vaucher S, Nicula R
Mechanism and kinetics of the reduction of magnetite to iron during heating in a microwave E-field maximum
JOURNAL OF APPLIED PHYSICS 105, 124901 (2009)

Suga M, Maeda S, Nakagawa S, Yamashita E, Tsukihara T
A description of the structural determination procedures of a gap junction channel at 3.5A resolution
ACTA CRYSTALLOGRAPHICA SECTION D-BIOLOGICAL CRYSTALLOGRAPHY 65, 758 (2009)

Surade S, Ochi T, Nietlispach D, Chirgadze D, Moreno A
Investigations into Protein Crystallization in the Presence of a Strong Magnetic Field
CRYSTAL GROWTH & DESIGN 10, 691 (2009)

Sydow JF, Brueckner F, Cheung ACM, Damsma GE, Dengl S, Lehmann E, Vassylyev D, Cramer P
Structural Basis of Transcription: Mismatch-Specific Fidelity Mechanisms and Paused RNA Polymerase II with Frayed RNA
MOLECULAR CELL 34, 710 (2009)

Sydow JF, Cramer P
RNA polymerase fidelity and transcriptional proofreading
CURRENT OPINION IN STRUCTURAL BIOLOGY 19, 732 (2009)

Szikszai Z, Uzonyi I, Kiss AZ, Sziki GA, Vantelon D, Rozsa P
Investigation of impact materials from the Barringer Meteor Crater by micro-XANES and micro-PIXE techniques
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS 267, 2229 (2009)

Tanaka H, Kato K, Yamashita E, Sumizawa T, Zhou Y, Yao M, Iwasaki K, Yoshimura M, Tsukihara T
The Structure of Rat Liver Vault at 3.5 Angstrom Resolution
SCIENCE 323, 384 (2009)

Tew MW, Miller JT, van Bokhoven JA
Particle size effect of hydride formation and surface hydrogen adsorption of nano-sized palladium catalysts: L3 edge vs K edge X-ray absorption spectroscopy
JOURNAL OF PHYSICAL CHEMISTRY C 113, 15140 (2009)

Thomas C, Fricke I, Weyand M, Berken A
3D structure of a binary ROP-PRONE complex: the final intermediate for a complete set of molecular snapshots of the RopGEF reaction
BIOLOGICAL CHEMISTRY 390, 427 (2009)

Trcera N, Cabaret D, Rossano S, Farges F, Flank AM, Lagarde P
Experimental and theoretical study of the structural environment of magnesium in minerals and silicate glasses using X-ray absorption near-edge structure
PHYSICS AND CHEMISTRY OF MINERALS 36, 241 (2009)

Tregenna-Piggott PW, Sheptyakov D, Keller L, Klokishner SI, Ostrovsky SM, Palii AV, Reu OS, Bendix J, Brock-Nannestad T, Pedersen K, Weihe H, Mutka H
Single-Ion Anisotropy and Exchange Interactions in the Cyano-Bridged Trimers MnIII2MIII(CN)6 (MIII = Co, Cr, Fe) Species Incorporating[Mn(5-Brsalen)]+ Units: An Inelastic Neutron Scattering and Magnetic Susceptibility Study
INORGANIC CHEMISTRY 48, 128 (2009)

Tritschler F, Braun JE, Eulalio A, Truffault V, Izaurralde E, Weichenrieder O
Structural Basis for the Mutually Exclusive Anchoring of P Body Components EDC3 and Tral to the DEAD Box Protein DDX6/Me31B
MOLECULAR CELL 33, 661 (2009)

Tritschler F, Braun JE, Motz C, Igreja C, Haas G, Truffault V, Izaurralde E, Weichenrieder O
DCP1 forms asymmetric trimers to assemble into active mRNA decapping complexes in metazoa
PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 106, 21591 (2009)

Ulens C, Akdemir A, Jongejan A, van Elk R, Bertrand S, Perrakis A, Leurs R, Smit AB, Sixma TK, Bertrand D, de Esch IJP
Use of Acetylcholine Binding Protein in the Search for Novel alpha 7 Nicotinic Receptor Ligands. In Silico Docking, Pharmacological Screening, and X-ray Analysis
JOURNAL OF MEDICINAL CHEMISTRY 52, 2372 (2009)

Vandermarliere E, Bourgois TM, Winn MD
Structure of Bacillus subtilis GH family 43 arabinoxylan arabinofuranohydrolase
BIOCHEMICAL JOURNAL 418, 39 (2009)

Vantelon D, Lagarde P, Flank AM, Berrier E, Secordel X, Cristol S, La Fontaine C, Villain F, Briois V
Applications in materials science of combining Raman and X-rays at the macro- and micrometric scale

PHASE TRANSITIONS 82, 322 (2009)

Vollmuth F, Blankenfeldt W, Geyer M
Structures of the Dual Bromodomains of the P-TEFb-activating Protein Brd4 at Atomic Resolution
JOURNAL OF BIOLOGICAL CHEMISTRY 284, 36547 (2009)

Warmuth S, Zimmermann I, Dutzler R
X-ray Structure of the C-Terminal Domain of a Prokaryotic Cation-Chloride Cotransporter
STRUCTURE 17, 538 (2009)

Weinert C, Grutter C, Roschitzki-Voser H, Mittl PRE, Grutter MG
The Crystal Structure of Human Pyrin B30.2 Domain: Implications for Mutations Associated with Familial Mediterranean Fever
JOURNAL OF MOLECULAR BIOLOGY 394, 226 (2009)

Wenzl MV, Beretta M, Gorren ACF, Zeller A, Baral PK, Gruber K, Russwurm M, Koesling D, Schmidt K, Mayer B
Role of the General Base Glu-268 in Nitroglycerin Bioactivation and Superoxide Formation by Aldehyde Dehydrogenase-2
JOURNAL OF BIOLOGICAL CHEMISTRY 284, 19878 (2009)

Winkler A, Motz K, Riedl S, Puhl M, Macheroux P, Gruber K
Structural and Mechanistic Studies Reveal the Functional Role of Bicovalent Flavinylation in Berberine Bridge Enzyme
JOURNAL OF BIOLOGICAL CHEMISTRY 284, 19993 (2009)

Winkler A, Puhl M, Weber H, Kutchan TM, Gruber K, Macheroux P
Berberine bridge enzyme catalyzes the six electron oxidation of (S)-reticuline to dehydroscoulerine
PHYTOCHEMISTRY 70, 1092 (2009)

Winklmeier A, Weyand M, Schreier C, Kalbitzer HR, Kremer W
Crystallization and preliminary X-ray diffraction studies of the tetramerization domain derived from the human potassium channel Kv1.3
ACTA CRYSTALLOGRAPHICA SECTION F-STRUCTURAL BIOLOGY AND CRYSTALLIZATION COMMUNICATIONS 65, 688 (2009)

Wu YI, Frey D, Lungu OI, Jaehrig A, Schlichting I, Kuhlman B, Hahn KM
A genetically encoded photoactivatable Rac controls the motility of living cells
NATURE 461, 104 (2009)

Yu S, Jensen V, Seeliger J, Feldmann I, Weber S, Schleicher E, Haussler S, Blankenfeldt W
Structure Elucidation and Preliminary Assessment of Hydrolase Activity of PqsE, the Pseudomonas Quinolone Signal (PQS) Response Protein
BIOCHEMISTRY 48, 10298 (2009)

von Moeller H, Basquin C, Conti E
The mRNA export protein DBP5 binds RNA and the cytoplasmic nucleoporin NUP214 in a mutually exclusive manner
NATURE STRUCTURAL & MOLECULAR BIOLOGY 16, 247 (2009)

PUBLICATIONS WITH SYN AUTHOR(S) AND NOT DESCRIBING AN SLS EXPERIMENT

Bech M, Bunk O, David C, Ruth R, Rifkin J, Loewen R, Feidenhans'l R, Pfeiffer F
Hard X-ray phase-contrast imaging with the Compact Light Source based on inverse Compton X-rays
JOURNAL OF SYNCHROTRON RADIATION 16, 43 (2009)

Bech M, Jensen TH, Feidenhans'l R, Bunk O, David C, Pfeiffer F
Soft-tissue phase-contrast tomography with an x-ray tube source
PHYSICS IN MEDICINE AND BIOLOGY 54, 2747 (2009)

Bettinger JS, Piamonteze C, Chopdekar RV, Liberati M, Arenholz E, Suzuki Y
Room-temperature photomagnetism in the spinel ferrite (Mn, Zn, Fe)(3)O-4 as seen via soft x-ray magnetic circular dichroism
PHYSICAL REVIEW B 80, 140413 (2009)

Bodenthin Y, Schwarz G, Tomkowicz Z, Geue T, Haase W, Pietsch U, Kurth DG
Liquid Crystalline Phase Transition Induces Spin Crossover in a Polyelectrolyte Amphiphile Complex
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 131, 2934 (2009)

Bodenthin Y, Schwarz G, Tomkowicz Z, Lommel M, Geue TH, Haase W, Moehwald H, Pietsch U, Kurth DG
Spin-crossover phenomena in extended multi-component metallo-supramolecular assemblies
COORDINATION CHEMISTRY REVIEWS 253, 2414 (2009)

Bonfanti M, Grilli E, Guzzi M, Chrastina D, Isella G, von Kanel H, Sigg H
Direct gap related optical transitions in Ge/SiGe quantum wells
PHYSICA E-LOW-DIMENSIONAL SYSTEMS & NANOSTRUCTURES 41, 972 (2009)

Borisenko SV, Kordyuk AA, Zabolotnyy VB, Inosov DS, Evtushinsky D, Buchner B, Yaresko AN, Varykhalov A, Follath R, Eberhardt W, Patthey L, Berger H
Two Energy Gaps and Fermi-Surface "Arcs" in NbSe2
PHYSICAL REVIEW LETTERS 102, 166402 (2009)

Diaz A, Mocuta C, Stangl J, Mandl B, David C, Vila-Comamala J, Chamard V, Metzger TH, Bauer G
Coherent diffraction imaging of a single epitaxial InAs nanowire using a focused x-ray beam
PHYSICAL REVIEW B 79, 125324 (2009)

Diaz A, Mocuta C, Stangl J, Vila-Comamala J, David C, Metzger TH, Bauer G
Spatially resolved strain within a single SiGe island investigated by X-ray scanning microdiffraction
PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE 206, 1829 (2009)

Donath T, Chabior M, Pfeiffer F, Bunk O, Reznikova E, Mohr J, Hempel E, Popescu S, Hoheisel M, Schuster M, Baumann J, David C
Inverse geometry for grating-based x-ray phase-contrast imaging
JOURNAL OF APPLIED PHYSICS 106, 054703 (2009)

Donath T, Pfeiffer F, Bunk O, Groot W, Bednarzik M, Grunzweig C, Hempel E, Popescu S, Hoheisel M, David C
Phase-contrast imaging and tomography at 60 keV using a conventional x-ray tube source
REVIEW OF SCIENTIFIC INSTRUMENTS 80, 053701 (2009)

Erat S, Braun A, Ovalle A, Piamonteze C, Liu Z, Graule T, Gauckler LJ
Correlation of O (1s) and Fe (2p) near edge x-ray absorption fine structure spectra and electrical conductivity of La1-xSrxFe0.75Ni0.25O3-delta
APPLIED PHYSICS LETTERS 95, 174108 (2009)

Fendt LA, Stohr M, Wintjes N, Enache M, Jung TA, Diederich F
Modification of Supramolecular Binding Motifs Induced By Substrate Registry: Formation of Self-Assembled Macrocycles and Chain-Like Patterns
CHEMISTRY-A EUROPEAN JOURNAL 15, 11139 (2009)

Franken JH, Moehrke P, Klaeui M, Rhensius J, Heyderman LJ, Thiele JU, Swagten HJM, Gibson UJ, Ruediger U
Effects of combined current injection and laser irradiation on Permalloy microwire switching
APPLIED PHYSICS LETTERS 95, 212502 (2009)

Glover JC, Schmitt T, Mattesini M, Adell M, Ilver L, Kanski J, Kjeldgaard L, Agaker M, Martensson N, Ahuja R, Nordgren J, Rubensson JE
Stationary and dispersive features in resonant inelastic soft X-ray scattering at the Ge 3p resonances
JOURNAL OF ELECTRON SPECTROSCOPY AND RELATED PHENOMENA 173, 103 (2009)

Herzen J, Donath T, Pfeiffer F, Bunk O, Padeste C, Beckmann F, Schreyer A, David C
Quantitative phase-contrast tomography of a liquid phantom using a conventional x-ray tube source
OPTICS EXPRESS 17, 10010 (2009)

Hornung B, Bodi A, Pongor CI, Gengeliczki Z, Baer T, Sztaray B
Dissociative Photoionization of X(CH3)(3) (X = N, P, As, Sb, Bi): Mechanism, Trends, and Accurate Energetics
JOURNAL OF PHYSICAL CHEMISTRY A 113, 8091 (2009)

Hsieh D, Xia Y, Qian D, Wray L, Meier F, Dil JH, Osterwalder J, Patthey L, Fedorov AV, Lin H, Bansil A, Grauer D, Hor YS, Cava RJ, Hasan MZ
Observation of Time-Reversal-Protected Single-Dirac-Cone Topological-Insulator States in Bi2Te3 and Sb2Te3
PHYSICAL REVIEW LETTERS 103, 146401 (2009)

Khasanov R, Bendele M, Amato A, Babkevich P, Boothroyd AT, Cervellino A, Conder K, Gvasaliya SN, Keller H, Klauss HH, Luetkens H, Pomjakushin V, Pomjakushina E, Roessli B
Coexistence of incommensurate magnetism and superconductivity in Fe(1+y)SexTe(1-x)
PHYSICAL REVIEW B 80, 140511 (2009)

Kirk E, Tsujino S, Vogel T, Jefimovs K, Gobrecht J, Wrulich A
Fabrication of all-metal field emitter arrays with controlled apex sizes by molding
JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B 27, 1813 (2009)

Klaui M, Ilgaz D, Heyne L, Kim JS, Boulle O, Schieback C, Zinser F, Krzyk S, Fonin M, Rudiger U, Backes D, Heyderman LJ, Mentes TO, Locatelli A
Concepts for Domain Wall Motion in Nanoscale Ferromagnetic Elements due to Spin Torque and in Particular Oersted Fields
JOURNAL OF MAGNETICS 14, 53 (2009)

Kuepper K, Raekers M, Taubitz C, Prinz M, Derks C, Neumann M, Postnikov AV, de Groot FMF, Piamonteze C, Prabhakaran D, Blundell SJ
Charge order, enhanced orbital moment, and absence of magnetic frustration in layered multiferroic LuFe2O4
PHYSICAL REVIEW B 80, 220409 (2009)

Kuzmenko AB, van Heumen E, van der Marel D, Lerch P, Blake P, Novoselov KS, Geim AK
Infrared spectroscopy of electronic bands in bilayer graphene
PHYSICAL REVIEW B 79, 115441 (2009)

Lange C, Koster NS, Chatterjee S, Sigg H, Chrastina D, Isella G, von Kanel H, Schafer M, Kira M, Koch SW
Ultrafast nonlinear optical response of photoexcited Ge/SiGe quantum wells: Evidence for a femtosecond transient population inversion
PHYSICAL REVIEW B 79, 201306 (2009)

Le Guyader L, Kirilyuk A, Rasing T, Smolyaninov II
Electromagnetic surface wave induced magnetic anisotropy
JOURNAL OF PHYSICS D-APPLIED PHYSICS 42, 105003 (2009)

Lovesey SW, Staub U
Calculated chiral and magneto-electric dichroic signals for copper metaborate (CuB2O4) in an applied magnetic field
JOURNAL OF PHYSICS-CONDENSED MATTER 21, 142201 (2009)

Lovesey SW, Staub U
Reply to comment on 'Calculated chiral and magneto-electric dichroic signals for copper metaborate (CuB2O4) in an applied magnetic field'
JOURNAL OF PHYSICS-CONDENSED MATTER 21, 498002 (2009)

M Mulders A, Loosvelt H, Fraile Rodriguez A, Popova E, Konishi7 K Temst T, Karis O, Arvanitis D, Van Haesendonck C
On the interface magnetism of thin oxidized Co films: orbital and spin moments
JOURNAL OF PHYSICS-CONDENSED MATTER 21, 124211 (2009)

Matena M, Llanes-Pallas A, Enache M, Jung T, Wouters J, Champagne B, Stohr M, Bonifazi D
Conformation-controlled networking of H-bonded assemblies on surfaces
CHEMICAL COMMUNICATIONS 24, 3525 (2009)

Menendez E, Liedke MO, Fassbender J, Gemming T, Weber A, Heyderman LJ, Rao KV, Deevi SC, Surinach S, Baro MD, Sort J, Nogues J
Direct Magnetic Patterning due to the Generation of Ferromagnetism by Selective Ion Irradiation of Paramagnetic FeAl Alloys
SMALL 5, 229 (2009)

Minasian SG, Krinsky JL, Rinehart JD, Copping R, Tyliszczak T, Janousch M, Shuh DK, Arnold J
A Comparison of 4f vs 5f Metal-Metal Bonds in (CpSiMe3)(3)M-ECp (M = Nd, U; E = Al, Ga; Cp* = C5Me5): Synthesis, Thermodynamics, Magnetism, and Electronic Structure*
JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 131, 13767 (2009)

Muller K, Kara A, Kim TK, Bertschinger R, Scheybal A, Osterwalder J, Jung TA
Multimorphism in molecular monolayers: Pentacene on Cu(110)
PHYSICAL REVIEW B 79, 245421 (2009)

Pfeiffer F, Bech M, Bunk O, Donath T, Henrich B, Kraft P, David C
X-ray dark-field and phase-contrast imaging using a grating interferometer
JOURNAL OF APPLIED PHYSICS 105, 102006 (2009)

Piamonteze C, Miedema P, de Groot FMF
Accuracy of the spin sum rule in XMCD for the transition-metal L edges from manganese to copper
PHYSICAL REVIEW B 80, 184410 (2009)

Richter C-P, Shintani-Smith S, Fishman A, David C, Robinson I, Rau C
Imaging of cochlear tissue with a grating interferometer and hard X-rays
MICROSCOPY RESEARCH AND TECHNIQUE 72, 902 (2009)

Rigon L, Arfelli F, Astolfo A, Bergamaschi A, Dreossi D, Longo R, Menk RH, Schmitt B, Vallazza E, Castelli E
A single-photon counting "edge-on" silicon detector for synchrotron radiation mammography
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT 608, S62 (2009)

Salazar-Alvarez G, Kavich JJ, Sort J, Mugarza A, Stepanow S, Potenza A, Marchetto H, Dhesi SS, Baltz V, Dieny B, Weber A, Heyderman LJ, Nogues J, Gambardella P
Direct evidence of imprinted vortex states in the antiferromagnet of exchange biased microdisks
APPLIED PHYSICS LETTERS 95, 012510 (2009)

Samuely T, Liu SX, Haas M, Decurtins S, Jung TA, Stohr M
Self-Assembly of Individually Addressable Complexes of C-60 and Phthalocyanines on a Metal Surface: Structural and Electronic Investigations
JOURNAL OF PHYSICAL CHEMISTRY C 113, 19373 (2009)

Schift H, Kim G, Lee J, Gobrecht J
3D visualization of mold filling stages in thermal nanoimprint by white light interferometry and atomic force microscopy
NANOTECHNOLOGY 20, 355301 (2009)

Schift H, Spreu C, Schleunitz A, Gobrecht J, Klukowska A, Reuther F, Gruetzner G
Easy mask-mold fabrication for combined nanoimprint and photolithography
JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B 27(6), 2850 (2009)

Schmidt T, Reiche S
Undulators for the SwissFEL
PROCEEDINGS OF FEL 2009, Liverpool, UK, 706 (2009)

Sing M, Berner G, Goss K, Muller A, Ruff A, Wetscherek A, Thiel S, Mannhart J, Pauli SA, Schneider CW, Willmott PR, Gorgoi M, Schafers F, Claessen R
Profiling the Interface Electron Gas of LaAlO3/SrTiO3 Heterostructures with Hard X-Ray Photoelectron Spectroscopy
PHYSICAL REVIEW LETTERS 102, 176805 (2009)

Trabadelo V, Retolaza A, Merino S, Cruz A, Heredia P, Foelske A, Schift H, Padeste C
Protein patterning by thermal nanoimprint lithography and NH3-plasma functionalization of polystyrene
JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B 27, 1060 (2009)

Vanoni C, Jung TA, Tsujino S
Temperature dependent charge-injection at the metal-organic semiconductor interface and density of states in pristine and doped pentacene
APPLIED PHYSICS LETTERS 94, 253306 (2009)

Virgilio M, Bonfanti M, Chrastina D, Neels A, Isella G, Grilli E, Guzzi M, Grosso G, Sigg H, von Kanel H
Polarization-dependent absorption in Ge/SiGe multiple quantum wells: Theory and experiment
PHYSICAL REVIEW B 79, 075323 (2009)

Vlasenko A, Huthwelker T, Gaggeler HW, Ammann M
Kinetics of the heterogeneous reaction of nitric acid with mineral dust particles: an aerosol flowtube study
PHYSICAL CHEMISTRY CHEMICAL PHYSICS 11, 7921 (2009)

BOOKS

P. Beaud, S. L. Johnson, C.J. Milne, F. Krasniqi, E. Vorobeva, G. Ingold
Atomic motion in laser excited bismuth studied with femtosecond x-ray diffraction
in “Ultrafast Phenomena XVI”, editors P. Corkum, S. De Silvestri, K.A. Nelson, E. Riedle, R.W. Schoenlein, Springer Series in Chemical Physics vol. 92, Springer Verlag, Berlin, Germany, Hardcover (2009), 1031 pp., 667 illus, 104-106, ISBN: 978-3-540-95945-8

F. Krasniqi, S. L. Johnson, P. Beaud, M. Kaiser, D. Grolimund, G. Ingold
Influence of laser heating time on strain wave dynamics in InSb
in “Ultrafast Phenomena XVI”, editors P. Corkum, S. De Silvestri, K.A. Nelson, E. Riedle, R.W. Schoenlein, Springer Series in Chemical Physics vol. 92, Springer Verlag, Berlin, Germany, Hardcover (2009), 1031 pp., 667 illus, 238-240, ISBN: 978-3-540-95945-8

C. Milne, V.-T. Pham, W. Gawelda, A. El Nahhas, R.M. van der Veen, S. L. Johnson, P. Beaud, G. Ingold., C. Borca, D. Grolimund, R. Abela, M. Chergui, C. Bressler
Femtosecond x-ray absorption spectroscopy of a photoinduced spin-crossover process
in “Ultrafast Phenomena XVI”, editors P. Corkum, S. De Silvestri, K.A. Nelson, E. Riedle, R.W. Schoenlein, Springer Series in Chemical Physics vol. 92, Springer Verlag, Berlin, Germany, Hardcover (2009), 1031 pp., 667 illus, 122-124, ISBN: 978-3-540-95945-8

C. Quitmann, J. Raabe, A. Puzic, K. Kuepper, S. Wintz
Dynamics of Mesoscopic Magnetic Objects
in “Magnetism and Synchrotron Radiation: New Trends”, editors E. Beaurepaire, H. Bulou, F. Scheurer, J. P. Kappler, Series: Springer Proceedings in Physics, Vol. 133, Springer Verlag, Berlin, Germany, Hardcover (2010), ISBN: 978-3-642-04497-7

REPORTS

P. Boulanger, B. Nowack, A.C. Scheinost, A. Wahner, M. Ammann, L. Charlet, P. Dillmann, S. Gin, T. Lieven, M. Morrison, I. Nenner, D. Rickerby, D.R. Worsnop, J.M Zanotti, C. Ferry, M.A. Fontaine, T. Huthwelker, T. Jacquet, A. Kiendler-Scharr, A. Manceau, M.H. van der Voorde
Chapter 5.9, Environment, in: Grand European initiative on Nanoscience and nanotechnology using Neutron and synchrotron radiation sources (GENNESYS)
edited by H. Dosch, M.H. van der Voorde, 2009

Y. Ekinci,
Bilayer metallic wire-grids as efficient, low-cost, and broad-band polarizers,
SSOM Bulletin 2009

V.N. Strocov
Concept of a one-shot RIXS spectrometer for XFEL
Technical Report No. SLS-SPC-TA-2009-319, PSI, 2009

DIPLOMAS

C. David

– *Herstellung und Charakterisierung von Beugungsgittern für Röntgenabbildung im Phasenkontrast bei Photonenenergien über 60 keV*
  W. Groot, Hochschule Bremen, University of Applied Sciences, 2009

H. Schift, J. Gobrecht, Bachelor thesis coached

– *Aufbau eines Diffusionsphantoms mit Mikrofluidikkanälen aus gebondeten Polymerplatten*
  V. Di Chiara, University of Applied Sciences Nordwestschweiz, 2009

J. Gobrecht, H. Schift, Master thesis coached

– *Development of a Production and Quality Control Method for Micro- and Nano-Structured Parts Exemplary for Microfluidic Devices in Transparent Polyamides*
  C. Rytka, University of Applied Sciences Vorarlberg, 2009

G. Ingold

- *Femtosecond Bunch Slicing Diagnostic and Electron Bunch Length Measurements with Coherent Synchrotron Radiation at the Swiss Light Source*
  D. Abramsohn, TU Berlin, Germany, 2009

T.A. Jung

- *Molecular Electronics and Molecular Sprintronics at Interfaces*
  Ch.Wäckerlin, University of Basel, 2009

M. Radovic

- *Growth and characterization of YBCO/LSMO bilayers for non-equilibrium optical measurements*
  R. Arpaia, Università degli Studi di Napoli Federico II, Italy, 2009

P. Willmott, Masters thesis

- *Structural study of the superconducting interface between an insulator and a metal*
  C. Wang, Ludwig-Maximilians-Universität München, 2009

INVITED TALKS

A. Bergamaschi
Time resolved powder diffraction at the Swiss Light Source
1st Workshop for the High Resolution Powder Diffraction Beamline, Hamburg, Germany, 26.11.2009

A. Bodi
Internal energy selected ions: thermochemical networks and unimolecular dissociation mechanisms
2009 Molecular Informatics and Bioinformatics International Symposium, Institute for Advanced Study, Collegium Budapest, Hungary, 17–19.03.2009

A. Bodi
First Results from the iPEPICO Endstation at the Swiss Light Source: The Surprisingly Complex Spectroscopy and Dissociation Dynamics of Small Molecules
Asilomar Conference on Mass Spectrometry, Pacific Grove CA, USA, 16–20.10.2009

O. Bunk
Uncovering the microstructure of bone
3rd International Bone Research Association Scientific Seminar, Basel, Switzerland, 08-09.05.2009

O. Bunk
Scanning SAXS: Imaging nanoscale structures of extended objects
Interdisciplinary Symposium on 3D microscopy, Interlaken, Switzerland, 12-16.07.2009

O. Bunk
Multimodal imaging: STXM, SXDM, scanning SAXS and interferometric phase contrast imaging on tissue samples
*S*eminar at SOLEIL, Gif-sur-Yvette, France, 28.10.2009

L. Carroll
Infrared pump/probe spectroscopy of Ge laser material
Tyndall National Institute, Cork, Irland, 09.12.2009

X. Cui
High-resolution angle-resolved photoemission spectroscopy study on transition metals and transition metals doped titanium dichalcogenides materials
CEA Saclay, Paris, France,12–13.01.2009

X. Cui
High-resolution angle-resolved photoemission spectroscopy study on transition metals and transition metals doped titanium dichalcogenides materials in Swiss Light Source
Institute of Physics, Chinese Academy of Sciences (CAS), Beijing, China, 02-03.03.2009

X. Cui
High-resolution angle-resolved photoemission spectroscopy works in SLS
The 13th Hiroshima International Symposium on Synchrotron Radiation, Hiroshima University, Japan, 10-11.03.2009

X. Cui
High-resolution angle-resolved photoemission spectroscopy works in SLS
Institute of Physics of China-Swiss Light Source meeting, Paul Scherrer Institute, Villigen, Switzerland 19.10.2009

C. David
Diffractive X-Ray Optics for Imaging and Metrology Applications
DESY, Hamburg, Germany, 22.07.2009

C. David
Diffractive X-Ray Optics for Microscopy and Radiography Applications
SPIE Conference on Optics and Optoelectronics, Prague, Czech Republic, 23.04.2009

C. David
X-Ray Optics and Interferometrics
ICXOM20 Sattelite Workshop: Synchrotron-based micro(nano)-analysis and imaging methods Karlsruhe, Germany, 14.09.2009

A. Diaz
Towards strain imaging of epitaxial nanostructures using focused and coherent x-ray beams
Seminar at TU Dresden, Germany, 24.11.2009

H. Dil
Time, space, spin and angle-resolved photoemission
PSI-XFEL Science Workshop on Time-Resolved Spectroscopy on Correlated Electron Materials, Zürich, Switzerland, 06.03.2009

H. Dil
Spin resolved ARPES; From model Rashba systems to topological metals
AG Wiesendanger, University Hamburg, Hamburg, Germany, 18.05.2009

H. Dil
Measuring the full 3D spin electronic structure by spin-resolved ARPES
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09, Zürich, Switzerland, 24.07.2009

H. Dil
Spin-resolved ARPES on low dimensional Rashba systems
11th International Conference on Electronic Spectroscopy and Structure, Nara, Japan, 10.10.2009

Y. Ekinci
Controlling the coupling in Au and Al nanowires and nanoparticles for applications in nanooptics, biosensing and metamaterials
2. Mediterranean Conference on Nano-Photonics, Athens, Greece, 26-27.10.2009

A. Fraile-Rodríguez
Probing magnetism at the nanoscale using x-ray spectromicroscopy
University of Ulm, Ulm, Germany, 05.11.2009

J. Gobrecht
Topics in Innovation Circle 2 Nanomanufacturing
i-net, University Basel, Switzerland, 28.01.2009

J. Gobrecht
Project funding from NanoArgovia: Synergies with IC
i-net, University Basel, Switzerland, 28.01.2009

J. Gobrecht
Prägen von Mikro- und Nanostrukturen
ITG-Fachtagung, Electrosuisse, Winterthur, Switzerland, 29.01.2009

J. Gobrecht
Nanotechnologie: Chancen und Risiken
Adlatus Events 2009, Zürich, Switzerland, 22.04.2009

J. Gobrecht
F&E an Feld-Emitter-Elektonenquellen – Potenzial für kalte Elektronenquellen
PSI-XFEL-Indstrietag, Paul Scherrer Institut, Villigen PSI, Switzerland, 04.05.2009

J. Gobrecht
Nanostructure-fabrication: Origination, embossing and injection moulding
EPMT, Lausanne, Switzerland, 13.05.2009

J. Gobrecht
Nanotechnologie auf dem Vormarsch
Management Symposium Basel, Switzerland, 15.05.2009

J. Gobrecht
Mikro und Nano: ein Traumpaar?
swiss mnt network, Technopark, Luzern, Switzerland, 24.06.2009

J. Gobrecht
Nano-patterning of Polymer Surfaces
ChinaNANO 2009, Peking, China, 01.09.2009

J. Gobrecht
Funktionalisierung von Kunsstoffen durch Nanotechnologien
NanoEvent NanoEinstieg KMU, FHNW, Windisch, Switzrland, 18.11.2009

L.J. Heyderman
Patterned Magnetic Thin Films
Seminar, Thin Film Magnetism Group, University of Cambridge, UK, 03.02.2009

L.J. Heyderman
Patterned Magnetic Thin Films
Condensed matter seminar, Department of Physics, University of Basel, Switzerland, 18.05.2009

B. Henrich
Radiation Detector activities of the SLS Detectors Group
APS Users Week, 04-06.05.2009

T. Huthwelker
Synchrotron based microtomography and microspectroscopy of ice and aerosols relevant to atmospheric sciences
Physikalisch-chemisches Kolloquium, Technical University Braunschweig, Germany, 16.01.2009

G. Ingold
Towards Pump-Probe Resonant Diffraction: 100 -> 10 fs
SwissFEL Workshop Crazy Ideas and Challenges, Science Issues, Villigen, Switzerland, 27.02.2009

G. Ingold
Femtosecond x-ray absorption spectroscopy of a photoinduced spin-crossover process
Seminar, NSLS, Brookhaven National Laboratory, Upton, NY, USA, 29.10.2009

M. Johnson
Spectroscopy with Synchrotron Radiation and its Application to Thermochemistry
Colloquium: Physical and Theoretical Chemistry, Julius-Maximilians-Universität Würzburg, Germany, 21.07.2009

S. L. Johnson
Femtosecond x-ray diffraction
PSI-XFEL Science Workshop on Correlated Electron Materials, Zurich, Switzerland, 06.03.2009

S. L. Johnson
Femtosecond x-ray diffraction in solids: coherent and incoherent atomic dynamics far from equilibrium
Ultrafast X-ray Summer School, SLAC, Menlo Park, CA, USA, 15-19.06.2009

S. L. Johnson
Using femtosecond x-ray diffraction to study non-equilibrium structural dynamics: coherent and incoherent phonons
Max Planck Group for Structural Dynamics, Hamburg, Germany, 18.08.2009

S. L. Johnson
Coherent and incohrent dynamics in solids studied by grazing-incidence femtosecond x-ray diffraction
441st Wilhelm & Else Heraeus Seminar, Bad Honnef, Germany, 28.09-01.10.2009

S. L. Johnson
Watching atoms move: using x-ray diffraction to observe structural dynamics in crystals on fundamental time scales
Laser Science XXV, San Jose, CA, USA, 11-15.10.2009

S. L. Johnson
Femtosecond structural dynamics of non-equilibrium solids studied by x-ray diffraction
DESY Hamburg, Germany, 08.12.2009

S. L. Johnson
Watching atoms move: using x-ray diffraction to observe structural dynamics in crystals on fundamental time scales
European XFEL Femtosecond X-Ray Experiments Workshop, Budapest, Hungary, 09-11.12.2009

T.A. Jung, M. Stöhr, S. Schintke
Supra-Molecular Self Assembly at Surfaces: Towards Rational Architectures
SFB 668 – Kolloquium, Magnetismus vom Einzelatom zur Nanostruktur. Hamburg, Germany, 27.01.2009

T.A. Jung, M. Stöhr, S. Schintke
Controlling and Operating Physico-Chemical Properties of Molecules and Supra-Molecular assemblies by STM
COST Electron Controlled Chemical Lithography, WG3 Meeting, Zurich, Switzerland, 03.03.2009

T.A. Jung. M. Stöhr, S. Schintke
Supra-Molecular Self Assembly at Surfaces: Rational Architectures for Addressable Molecular Switches
Seminar given at the Hungarian Academy of Sciences (HAS), 02.04.2009

T.A. Jung, M. Stöhr, S. Schintke
Supra-Molecular Self Assembly at Surfaces: Rational Architectures for Addressable Molecular Switches with Increased Complexity and Novel Functionality
Molecular Electronics Meeting in Bern, Switzerland, 12.05.2009

T.A. Jung, M. Stöhr, S. Schintke
Self Assembly and Positioning: It works for Molecules as well as for other building blocks
Symposium in Honour of Prof. H.-J. Guentherodt's retirement, 18-19.06.2009

T.A. Jung, M. Stöhr
Nano-Imaging: From Science to Technology
Interdisciplinary Symposium on 3D Microscopy 2009, Interlaken, Switzerland, 12-16.07.2009

C. M. Kewish
Applications of Ptychography: Present and Future
Seminar at Coherent X-ray Scattering Group Meeting, Villigen PSI, Switzerland, 26.03.2009

C. M. Kewish
2-D Membrane Protein Crystallography at Future XFELs
European XFEL SCS Instrument Workshop, Villigen PSI, Switzerland, 04.06.2009

C. M. Kewish
Applications of Ptychography: Present and Future
Seminar at Synchrotron SOLEIL, Gif-sur-Yvette, France, 28.08.2009

C. M. Kewish
Applications of Ptychographic Coherent Diffractive Imaging
Coherent X-ray Imaging Methods Workshop, Melbourne, Australia, 02–04.10.2009

C. M. Kewish
2-D Membrane Protein Crystallography at Future XFELs
Seminar at Commonwealth Scientific and Industrial Research Organisation (CSIRO), Melbourne, Australia, 09.10.2009

Ph. Lerch
Condensed Matter Physics and IR Synchrotron Radiation
Workshop MIRAS 2009 Synchrotron Radiation Infrared Microscopy Synchrotron ALBA, Barcelona, Spain, 21.09.2009

E.Mengotti
Magnetic configurations in artificial kagome spin ice structures
School of Physics, University College Dublin, Ireland, 16.06.2009

A. Menzel
X-Ray Scattering Studies on Model Electrocatalysts
Elektrochemie-Seminar, Villigen PSI, Switzerland, 29.06.2009

A. Menzel
Ptychographic Imaging in Materials and Life Sciences
Frontiers in Optics 2009/Laser Science XXV, San Josa, California, USA, 13.10.2009

K. Müller, A. Kara, T. Brugger, A. Scheybal, R. Bertschinger, A. Bendounan, T. Greber, T. A. Jung
Electronic States at the Metal / Organic Semiconductor Interface: Pentacene on Cu(110)
MolCHSurf IV, Bern, Switzerland, 29.06.2009

F. Nolting
Nanostrutured GdFeCo film investigated with X-rays
International workshop on Ultrafast laser control of spins in nanomagnets, Njiemgen, The Netherlands, 25– 30.10.2009

F. Nolting
A close look at magnetic multilayers and nanomagnets with X-ray magnetic dichroism
International workshop on Polarized Neutrons and Synchrotron X-rays for Magnetism, Bonn, Germany, 02-05.08.2009

K. Mader
Robot System at Tomcat
Joint Users, Paul Scherrer Institute, Villigen, Switzerland, 13.11.2009

F. Marone
Towards real-time tomography: fast reconstruction algorithms
SLS Symposium, PSI, Villigen, Switzerland, 03.11.2009

F. Marone
Synchrotron based tomographic microscopy: fast, high-sensitive 3D imaging at the micron and nano-scale
CIMST Microscopy & Nanoscopy Seminar, ETH, Zurich, Switzerland, 15.10.2009

F. Marone
Synchrotron-based X-ray Microtomography in the Geosciences
Structural Geology Seminar, ETH, Zurich, Switzerland, 25.02.2009

R. Mokso
X-Ray Microscopy: principles and recent advances
Analytical Chemistry Symposium, ETH Zurich, Switzerland, 05.2009

V. Olieric, M. Wang, E. Ennifar, C. Schulze-Briese
Progress in S-SAD and P-SAD phasing at the Swiss Light Source
Winter School on Soft X-rays in Macromolecular Crystallography, BESSY, Berlin, Germany, 18-20.02.2009

L. Patthey
K-Space Microscopy by High Resolution ARPES
Workshop on High Resolution Electron Spectroscopy - Future and Perspectives, Soleil Synchrotron, Paris, France, 03-04.02.2009

M. Radovic
In-situ Angle-Resolved Photoelectron Spectroscopy of underdoped $YBa_2Cu_3O_{7-\delta}$ *thin films grown by Pulsed Laser Deposition*
Institute for Nucleas Science “Vinca” University of Belgrade, Serbia, 06.07.2009

M. Radovic
Reconstruction and Band Folding in the Underdoped Surface of $YBa_2Cu_3O_{7-\delta}$ *Thin Films Made by Pulsed Laser Deposition*
CNR-INFM, Napoli, Italy, 06.10.2009

M. Radovic
Angle-Resolved Photoelectron Spectroscopy (ARPES) on YBCO thin films
Physics Department – University of Fribourg, Switzerland, 03.12.2009

H. Schift
Visualization of Mold Filling Stages in Nanoimprint Lithography
Seminar talk at Korea Institute of Machinery & Materials (KIMM), Daejeon, Korea, 22.01.2009

H. Schift
Nanopatterning of Surfaces for Photonic Applications - Shaping Polymers by Nanoimprint Lithography
Nanoelectronics and Nanophotonics Colloquium, Swiss Electromagnetics Research and Engineering Centre (serec), ETH Zürich, Switzerland 25.06.2009

H. Schift
Fracture and Wear of “Nanopillars” - Defined Fracture at Interfaces using Scanning Force Microscopy
Micro-Tribology, 5th Int. Colloquium, Milowka, Poland, 21-24.09.2009

H. Schift
Nanofabrication with Polymers at PSI – the Nanoimprint Toolbox
Seminar talk at Molecular Foundry, Lawrence Berkeley National Lab, Berkeley, CA, USA, 10.11.2009

H. Schift
Nanofabrication with Polymers at PSI – the Nanoimprint Toolbox
Seminar talk at Hewlett Packard Labs, Palo Alto, CA, USA, 11.11.2009

H. Schift
Nanopatterning of 3D surfaces based on nanoimprint lithography – the EU project NaPANIL
MNC, 22nd Int. Microprocesses and Nanotechnology Conference, Sapporo, Hokkaido, Japan, 16-19.11.2009

J. Schlappa, T. Schmitt, F. Vernay, V. N. Strocov, V. Ilakovac, B. Thielemann, H. M. Ronnow, Vanishri S., A. Piazzalunga, X. Wang, L. Braicovich, G. Ghiringhelli, C. Marin, J. Mesot, B. Delley, L. Patthey
Collective spin-excitations in Cu L_3 *Resonant Inelastic X-ray Scattering from* $Sr_{14}Cu_{24}O_{41}$
Invited by Prof. M. Grioni to give a seminar presentation at a RIXS brainstorming meeting with Swiss users, EPFL, Lausanne, Switzerland, 07.01.2009

J. Schlappa
Elastic and inelastic soft x-ray scattering as powerful probe of electronic degrees of freedom
Internal seminar, Helmholtz-Zentrum Berlin, Germany, 26.06.2009

J. Schlappa, T. Schmitt, K. Zhou, V. N. Strocov, F. Vernay, B. Delley, B. Thielemann, J. Mesot, L. Patthey, V. Ilakovac, H. M. Ronnow, X. Wang, M. Grioni, G. Ghiringhelli, A. Piazzalunga, C. Dallera, L. Braicovich, S. Vanishri, C. Marin
Collective spin-excitations in low-dimensional spin systems probed by high-resolution resonant inelastic x-ray scattering (RIXS)
Internal seminar, Universität zu Köln, Germany, 02.07.2009

J. Schlappa, T. Schmitt, K. Zhou, F. Vernay, V. N. Strocov, V. Ilakovac, B. Thielemann, H. M. Ronnow, Vanishri S., A. Piazzalunga, X. Wang, L. Braicovich, G. Ghiringhelli, C. Marin, J. Mesot, B. Delley, L. Patthey
Collective magnetic excitations in low-dimensional spin systems probed by high-resolution resonant inelastic x-ray scattering
JUM@P '09, Villigen PSI, Switzerland, 12-13.10.2009

T. Schmidt
Undulators for the Swissfel
FEL 2009, Liverpool, UK, 23-28.08.2009

T. Schmidt
Undulator Development at PSI
Eastern Forum of Science and Technology: Physics and Technology of Advanced Undulators, Shanghai, China, 03-04.12.2009

B. Schmitt
Current and future detector development at the Swiss Light Source
10th International Conference on Synchrotron Radiation Instrumentation, SRI09, Melbourne, Australia, 27.09-02.10.2009

T. Schmitt
Pump and Probe Resonant Inelastic X-Ray Scattering at a Soft X-Ray FEL
PSI-XFEL Science Workshop on Time-Resolved Spectroscopy on Correlated Electron Materials, University of Zürich, Irchel, Zürich, Switzerland, 06.03.2009

T. Schmitt
RIXS from 3rd to 4th Generation Experiments
International workshop on the Spectroscopy and Coherent Scattering Endstation and associated instrumentation at the European XFEL, Paul Scherrer Institut, Villigen PSI, Switzerland, 02-04.06.2009

T. Schmitt
New Frontiers for High-Resolution Soft X-ray RIXS at the SLS
RIKEN International Workshop on Spectrometers and Instrumentation for IXS (SIIXS 2009), SPring-8, Hyogo, Japan, 21-23.06.2009

T. Schmitt
New Frontiers for High-Resolution Soft X-ray RIXS at the SLS
Toyohiko Kinoshita to give a seminar to the spectroscopy II group at Spring-8, Hyogo, Japan, 24.06.2009

T. Schmitt
Resonant Inelastic Soft X-Ray Scattering in Quasi One Dimensional Cuprates
Resonant Inelastic X-ray Scattering Workshop, ESRF, Grenoble, France, 29.06–01.07.2009

T. Schmitt
New Frontiers for High-Resolution Soft X-Ray RIXS at the SLS
Helmholtz-Zentrum Berlin, BESSY, Germany, 07.07.2009

T. Schmitt
Resonant Inelastic Soft X-Ray Scattering in Quasi One Dimensional Cuprates
Inelastic X-Ray Scattering Workshop, SLAC National Accelerator Laboratory, Stanford, USA, 03-05.08.2009

T.Schmitt
New Frontiers for High-Resolution Soft X-Ray RIXS at the SLS
SSG Lecture Series – Frontier of Synchrotron Radiation Science & Instrumentation, Advanced Light Source, Lawrence Berkeley National Laboratory, USA, 06.08.2009

T. Schmitt
New Frontiers for High-Resolution Soft X-Ray RIXS at the SLS
MAX-Lab, University Lund, Sweden, 16.09.2009

T. Schmitt, V. N. Strocov, J. Schlappa, K. J. Zhou, L. Patthey, C. Quitmann
New Frontiers for High-Resolution Soft X-Ray RIXS at the SLS
10th International Conference on Synchrotron Radiation Instrumentation – SRI 09, Melbourne, Australia, 27.09–02.10.2009

T. Schmitt
Resonant Inelastic Soft X-Ray Scattering in Quasi One Dimensional Cuprates
11-th International Conference on Electronic Spectroscopy and Structure (ICESS-11), Nara, Japan, 06.-10.10.2009

T. Schmitt, V. N. Strocov, J. Schlappa, K. J. Zhou, L. Patthey
New Frontiers for High-Resolution Soft X-Ray RIXS at the SLS
Workshop on Soft X-ray Scattering - satellite meeting of ICESS-11, National Synchrotron Radiation Research Center, HsinChu, Taiwan, 12-13.10.2009

T. Schmitt
New Frontiers for High-Resolution Soft X-Ray RIXS at the SLS
Diamond Light Source, Oxford, UK, 23.10.2009

T. Schmitt
Resonant Inelastic Soft X-Ray Scattering in Quasi One Dimensional Cuprates
Leibniz Institute for Solid State and Materials Research – IFW, Dresden, Germany, 26.11.2009

T. Schmitt
Pump-probe RIXS: Cu L_3 and O K edge vs. Cu K-edge
International workshop on the science and instrumentation at the European XFEL: Femtosecond X-Ray Experiments, Budapest, Hungary, 09-11.12.2009

C. Schulze-Briese
New instrumentation and recent developments at the SLS PX beamlines
3D Repertoire Final Meeting, Warszasa, Polska, 05.09.09

C. Schulze-Briese
Protein Crystallography
CIMST Summer School on Biomedical Imaging, Zurich, Switzerland, 03.09.2009

C. Schulze-Briese
New instrumentation and recent developments at the SLS PX beamlines
2009 American Crystallography Association Meeting, Toronto, Canada, 28.07.09

C. Schulze-Briese
Small is beautiful - Protein micro-crystallography at SLS
MX frontiers at the one micron scale, NSLS II at BNL, Upton NY, USA, 23.07.09

C. Schulze-Briese
PILATUS 6M - Protein Crystallography with 6 million detectors
BCA Spring Meeting, Loughborough, UK, 23.04.09

M. Schuster, M. Chabior, M. Engelhardt, J. Baumann, E. Hempel, T. Donath, C. David, F. Pfeiffer, C. Schroer
Grating Based X-Ray Phase Contrast Imaging using Laboratory X-ray Sources
58th Denver X-ray Conference, Colorado Springs, USA, 27.-31.07.2009

M. Shi, J. Mesot
The Electronic Excitations in the pseudogap of Cuprates as Studied by ARPES
MANEP internal Workshop, Neuchatel, Switzerland, 19.01.2009

M. Shi, J. Mesot
The dichotomy of the dispersion in the pseudogap phase of cuprates as studied by ARPES
SMEC2009, Study of Matter at Extreme Conditions, Miami, Western Caribbean, USA, 28.03-02.04.2009

M. Shi, J. Mesot
Electronic Excitations of High-temperature Cuprate Superconductors Probed by ARPES
Seventh International Conference on New Theories, Discoveries, and Applications of Superconductors and Related Materials, Beijing, China, May 13–16.05.2009

H. Sigg
THz optics and beam transport
Workshop for a THz source at the SwissFEL, Zurzach, Switzerland, 10.12.2009

H.H. Solak, V. Auzelyte, A. Langner, Y. Ekinci, C. David, J. Gobrecht
EUV Interference Lithography at the Limits of Patterning with Photons
7th Fraunhofer IISB Lithography Simulation Workshop, Hersbruck, Germany, 25-27.09.2009

H.H. Solak
Optimized Metallic Nanostructures for Plasmonic Field Enhancement
5th Nanoscience and Nanotechnology Conference, Eskisehir, Turkey, 08-12.06.2009

H.H. Solak,
Nanolithography in the extreme ultraviolet range
Electron Controlled Chemical Lithography 2009 Meeting, Istanbul, Turkey, 05.-08.06.2009

H.H. Solak, V. Auzelyte, A. Langner, S. S. Sarkar, A. Weber, H. Pruchova, M. Kropf, C. David, J. Gobrecht,
EUV Interference Lithography,
International EUVL Workshop, Honolulu, USA, 13-17.07.2009

M. Stampanoni
X-ray Tomographic Microscopy: a powerful, real-space imaging technique
AIC International School, Camerino, Italy, 01.09.2009

M. Stampanoni
Synchrotron-based Tomographic Microscopy: fast, high-sensitive and high-resolution 3D imaging at the micron scale
EGU General Assembly, Vienna,Austria, 23.04.2009

M. Stampanoni
Synchrotron-based Tomographic Microscopy: Fast, High-Sensitive Micron- and Nanoscale Imaging
E-MRS Fall Meeting, Boston, USA, 01-04.12.2009

M. Stampanoni
Phase contrast X-ray tomographic microscopy: a new tool in bioimaging
Seminar at the Institute of Research in Biomedicine, Bellinzona, Switzerland, 20.11.2009

M. Stampanoni
Synchrotron-based tomographic microscopy
PhD course, Lausanne, Switzerland, 18.12.2009

M. Stampanoni
Tomographic Microscopy at the SLS: the TOMCAT instrument
LNM Analytics XAS Meeting, Villigen, Switzerland, 08.04.2009

M. Stampanoni
Synchrotron-based Tomographic Microscopy: fast, high-sensitive and high-resolution 3D imaging at the micron- and nano scale
Seminars at MaxLAB, Lund, Sweden 28.05.2009

M. Stampanoni
Phase contrast tomographic imaging at TOMCAT
MaxLAB User's Meeting, Lund, Sweden, 04.11.2009

M. Stampanoni
TOMCAT: A powerful tool for non-destructive investigations at the micron and nano-scale,
Nestle Research Center – Seminar, Lausanne, Switzerland, 16.11.2009

M. Stampanoni
Non-destructive, volumetric high-resolution quantitative imaging of soft tissue
Novartis Institute of Biomedical Research Inc. – Seminar, Boston, USA, 03.12.2009

M. Stampanoni
Advanced X-ray Phase Contrast Tomographic Imaging with a Grating Interferometer
Tuft Univ. School of Medicine – Seminar, USA, 04.12.2009

M. Stampanoni
Imaging at the SLS: TOMCAT and its interactions with ETH Zürich and Lausanne,
SLS-SAC Meeting, Villigen, Switzerland, 23.11.2009

U. Staub, Y. Bodenthin, C. Piamonteze, M. García-Fernández, V. Scagnoli, M. Garganourakis, S. Koohpayeh, D. Fort, S. P. Collins, S. W. Lovesey
Study of Magneto-Electric Effects by Resonant X-Ray Diffraction
Workshop on Soft X-ray Scattering, NSRRC, Taiwan, 12-13.10.2009

U. Staub
Advanced Resonant Soft X-Ray Diffraction to Study Ordering Phenomena in Magnetic Materials
11-th International Conference on Electronic Spectroscopy and Structure (ICESS-11), Nara, Japan, 06-10.10.2009

U. Staub
Advanced Resonant Soft X-Ray Diffraction to Study Ordering Phenomena in Magnetic Materials
Polarized Neutrons and Synchrotron X-rays for Magnetism (PNSXM 2009), Bonn, Germany, 02-05.08.2009

U. Staub
Resonant Soft X-Ray Diffraction: Direct Access to Electronic and Magnetic Ordering Phenomena
Advanced Light Source, Berkeley, USA, 18.03.2009

U. Staub
Resonant X-ray scattering
PSI_XFEL Science Workshop on Time-Resolved-Spectroscopy on Correlated Electron Materials, University of Zürich, Switzerland, 06.03.2009

U. Staub
Resonant Soft X-Ray Diffraction: Direct Access to Electronic and Magnetic Ordering Phenomena
Institut für Festkörperforschung, Jülich, Germany, 17.02.2009

M. Stöhr, M. Matena, M. Wahl, J. Lobo-Checa, H. Dil, L.H. Gade, T.A. Jung, J. Zegenhagen
Reactions on surfaces for the creation of supramolecular polymers
Electron Controlled Chemical Lithography Meeting, Istanbul, Turkey, 06.2009

V.N. Strocov
High-resolution soft-X-ray beamline ADRESS at Swiss Light Source for resonant X-ray scattering and angle-resolved photoelectron
BESSY, Berlin, Germany, 31.03.2009

P. Thibault
High-resolution scanning X-ray diffraction microscopy
Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication, Florida, USA, 29.05.2009

J. F. van der Veen
Future access to European research infrastructures
ERF seminar, Lund, Sweden, 27.10.2009

J. Vila-Comamala
Nanofabrication of X-ray Diffractive Optics
London Center for Nanotechnology, London, United Kingdom, 29.06.2009

P. Willmott
Graphene on Ruthenium
Workshop on Spectroscopy of Novel Materials, Rigi, Switzerland, 19.01.2009

P. Willmott
The role of surface diffraction in understanding the properties of interfaces and surfaces in complex metal oxides
MaNEP workshop, Neuchatel, Switzerland, 23.01.2009

P. Willmott
The conducting interface between $SrTiO_3$ *and* $LaAlO_3$
3S'09 Symposium on Surface Science, St. Moritz, Switzerland, 11.03.2009

P. Willmott
Surface x-ray diffraction of complex metal oxide surfaces and interfaces – a new era
Spring MRS Meeting, San Francisco, USA, 15.04.2009

P. Willmott
Surface x-ray diffraction of complex systems – a new era
Festkörperphysikseminar, Physik Institut, University of Zürich, Switzerland, 06.05.2009

P. Willmott
A structural basis for the conducting interface between insulating perovskites
Villa Conference on Complex Oxide Heterostructures, St. Thomas, Virgin Islands, USA, 16.09.2009

K. J. Zhou, J. Schlappa, V. N. Strocov, F. Vernay, B. Delley, L. Patthey, and T. Schmitt
Resonant Inelastic x-ray Scattering at the ADRESS beamline at SLS
Joint Users' Meeting at PSI: JUM@P '09, PSI, Villigen, Switzerland, 12-13.10.2009

K. J. Zhou, T. Schmitt, V. N. Strocov, J. Schlappa, L. Patthey
New frontiers of Resonant Soft X-ray Inelastic Scattering at the SLS
Institute of Physics, Chinese Academy of Sciences, Beijing, China, 22.12.2009

ORAL PRESENTATIONS

M. Ammann, T. Huthwelker, M. Kerbrat, T. Bartels-Rausch and A. Křepelová
Flow tube, Diffusion tube and molecular level Spectroscopic Studies of Nitrous, nitric and pernitric acid uptake on ice
SCOUT-O3 Laboratory Activity 5 Annual Meeting, Mainz, Germany, 16-18.02.2009

M. Ammann, V. Zelenay, A. Krepelova, J. Raabe, B. Watts, T. Huthwelker
The Climate Effect of Atmospheric Particles caught in Act.
JUM@P'09 Joint Users' Meeting at PSI, Villigen, Switzerland, 12-13.10.2009

B. P. Andreasson, M. Janousch, U. Staub, G. I. Meijer, A. Ramar, J. Krbanjevic, R. Schaeublin
Origin of oxygen vacancies in resistive switching memory devices
14th International Conference on X-ray Absorption Fine Structure, Camerino, Italy, 26-31.7.2009

N. Ballav, P. Morf, F. Nolting, F. von Wrochem, H-G. Nothofer, A. Yasuda, J. M. Wessels, T.A. Jung
Structure and electron transport through molecules assembled in multi-component molecular gradient layers
American Vacuum Society 56th International Symposium & Exhibition, San Jose, California, USA, 8-13.11.2009

T. Bartels-Rausch, M. Kerbrat, T. Huthwelker, A. Křepelová, T. Ulrich, M. Ammann
Beyond Adsorption: Recent Approaches in the Laboratory to study Uptake of Trace Gases to Ice
Fifth SCOUT-O3 Annual Meeting, Schliersee, Germany, 15-17.06.2009

P. Beaud, S. L. Johnson, E. Vorobeva, U. Staub, R.A. De Souza, C.J. Milne, Q. X. Jia, G. Ingold
Structural response to ultrafast melting of charge and orbital order in a manganite
JUM@P'09 Joint Users' Meeting at PSI, Villigen, Switzerland, 12-14.10.2009

R. Bingel-Erlenmeyer, V. Olieric, M. Wang, C. Schulze-Briese
A Crystallization Platform enabling Automated in situ Diffraction Screening
25th European Crystallographic Meeting, Istanbul, Turkey, 16-21.8.2009

J. Björk, M. Dyer, M. Matena, M. Stöhr, T.A. Jung, M. Persson
Adatom driven self-assembly of TAPP molecules on Cu(111) surface
Spring meeting of the DPG, Dresden, Germany, 03.2009

J. Björk, M. Matena, M. Dyer, J. Lobo-Checa, M. Enache, M. Stöhr, T. Jung, M. Persson
Adatom coordinated porous networks and polymeric chains of self-assembled TAPP molecules on Cu(111) surface
26th European Conference on Surface Science (ECOSS), Parma, Italy, 09.2009

O. Bunk
Scanning SAXS: imaging nano-scale structures of extended objects
XIV International Conference on Small-Angle Scattering, Oxford, United Kingdom, 13-18.9.2009

L. Carroll, H. Sigg, J. Faist, H.C. Liu
Investigating intersubband Raman-lasing as a function of excitation-energy and intensity using a broadband tuneable excitation-source
Int. Conference on Intersubband transitions in Quantum Wells ITQW-2009, Montreal, CA, USA, 07-11.09.2009

L. Carroll, P. Friedli, H. Sigg, P. Lerch
Using synchrotron infrared radiation from the Swiss light source to investigate semiconductor quantum well systems and laser devices
5th. International Workshop on Infrared Microscopy and Spectroscopy with Accelerator Based Sources (WIRMS), Banff, Alberta, CA, USA, 13–17.09.2009

X. Cui
High-resolution angle-resolved photoemission spectroscopy study on transition metals doped titanium dichalcogenides materials
26th European conference on surface science (ECOSS26), Auditorium Paganini e Centro Congressi di Parma, Italy, 30.08–04.09.2009

C. David
Features and Potential of X-ray Phase Contrast Imaging
XRAI Workshop, Astrium, Friedrichshafen, Germany, 30.06.2009

C. David,
Sub-micron x-ray focusing
PSI-XFEL Workshop, Villigen, Switzerland, 26.02.2009

C. David, J. Vila-Comamala, K. Jefimovs, T. Pilvi, M. Ritala, G. Tzvetkov, J. Raabe, R. Fink
Line-doubled Fresnel zone plates for ultra-high resolution x-ray microscopy
NanoFox Workshop, Grenoble, France, 10.02.2009

H. Dil, F. Meier, J. Lobo-Checa, L. Patthey, G. Bihlmayer, J. Osterwalder
Rashba type spin orbit splitting of quantum well states in thin Pb films
DPG-Tagung, Dresden, Germany, 26.03.2009

Y. Ekinci, A. Christ, M. Agio
Controlling the coupling in 1D and 2D metamaterials
5th Workshop on Numerical Methods for Optical Nano Structures Zurich, Switzerland, 06-07.07.2009

Y. Ekinci, A. Christ, M. Agio, N.A. Gippius, S.G. Tikhodeev, A.M. Prokhorov, H.H. Solak, O.J.F. Martin, J.F. Löffler
Controlling the plasmon modes of 1D and 2D plasmonic lattices by near-fi eld coupling
SPIE Optics and Photonics 2009, San Diego, California, USA, 04–06.08.2009

M. Enache, M. Matena, A.L. Pallas, T. Jung, D. Bonifazi, M. Stöhr
Conformation-controlled networking of H-bonded assemblies on surfaces
APS March meeting, Pittsburgh, USA, 03.2009

M. Enache, M. Matena, A.L. Pallas, T. Jung, D. Bonifazi, M. Stöhr
Conformation-controlled networking of H-bonded assemblies on surfaces
Workshop of the EU Marie Curie RTN PRAIRIES, Liverpool, UK, 04.2009

M. Enache, M. Matena, J.L.Checa, M. Stöhr, K. Müller, T. Jung, T. Riehm, L.H. Gade
Surface state confinement imposed by a nanoporous network
SPS, Poznan, Poland, 07.2009

M. Enache, M. Matena, J. Lobo-Checa, M. Stöhr, K. Müller, T.A. Jung, T. Riehm, L.H. Gade
Thermally induced polymerization of a perylene derivative on a Cu surface
26th European Conference on Surface Science (ECOSS), Parma, Italy, 09.2009

M. Enache, M. Matena, A.L. Pallas, T. Jung, D. Bonifazi, M. Stöhr
H-bond recognition for the formation of individual pores on Ag(111)
Workshop of the EU Marie Curie RTN PRAIRIES, Strasbourg, France, 09.2009

M. Enache, N.P. Reynolds, L.A. Fendt, M. Stöhr, N. Wintjes, T.A. Jung, F. Diederich
Cyano-directed self-assembly of n-modular porphyrin oligomers at surfaces: the delicate balance between competing interactions
AVS 56th International Symposium and Exhibition, San Jose, USA, 11.2009

F. Farges, A. Meibom, A. M. Flank, P. Lagarde, M. Janousch, J. Stolarski
Speciation of Mg in biogenic calcium carbonates
14th International Conference on X-ray Absorption Fine Structure, Camerino, Italy, 26-31.7.2009

A. Fraile Rodríguez, A. Kleibert, F. Nolting, J. Bansmann
X-ray Spectromicroscopy of Magnetic Single Nanocrystals
X-Ray Spectroscopy of Magnetic Solids (XRMS 2009), L'Orme des Merisiers, Saint Aubin, France, 19-20.01.2009

P. Friedli, H. Sigg, A. Wittmann, J. Faist
Gain/Loss Device Study of Narrow-Ridge Buried Heterostructure Quantum Cascade Lasers Using Broadband Infrared Transmission
European Conference on Lasers and Electro-Optics, CLEO-Europe, Munich, Germany, 22.-26.05.2009

P. Friedli, H. Sigg, A. Wittmann, J. Faist
Upper Laser State Related Gain and Loss in High Performance Single Mode Quantum Cascade Laser Devices
Int. Conference on Intersubband transitions in Quantum Wells, ITQW-2009, Montreal, CA, USA, 07–11.09.2009

M. R. Fuchs
Recent developments of the SLS beamline X10SA PXII
*10*th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2009

R. Ganter, B. Beutner, S. Binder, H. H. Braun, C. Gouch, C. Hauri, R. Ischebeck, F. le Pimpec, K. Li, M. L. Paraliev, M. Pedrozzi, T. Schietinger, B. Steffen, A. Trisorio, S. Tsujino
Electron beam characteristic from a diode-rf gun
The Physics and Applications of High Brightness Electron Beams 2009, Maui, USA, 16-19.11.2009

R. Ganter, B. Beutner, S. Binder, H. H. Braun, M. Broennimann, M. Dach, T. Garvey, C. Gouch, C. Hauri, M. Heiniger, R. Ischebeck, S. Ivkovic, Y. Kom, E. Kirk, F. le Pimpec, K. Li, R. Luescher, P. Ming, A. Oppelt, M. L. Paraliev, M. Pedrozzi, J.-Y. Raguin, T. Schietinger, T. Schilcher, B. Steffen, L. Rickin, S. Tsujino, A. Wrulich
Commisioning of a diode/rf photogun combination
Free Electron Laser Conference, Liverpool, UK, 23-28.08.2009

R. Giannini, A. Kristopuryan, Y. Ekinci, P.K. Sahoo, J.F. Löffler
A. Simple Fabrication of Nanoantennae over Large Areas
DPG 2009, Dresden, Germany, 22-27.03.2009

C. Grünzweig, C. David, O. Bunk, G. Frei, J. Kohlbrecher, M. Dierolf, E. Lehmann, R. Schäfer, P. Lejcek, H.M.R. Ronnow, F. Pfeiffer
Bulk Magnetic Domain Structures Visualized by Neutron Dark-Field Imaging,
International Conference on Magnetism (ICM), Karlsruhe, Germany, 26-31.07.2009

L.J. Heyderman, E.Mengotti, A. Fraile Rodríguez, A. Bisig, F.Nolting, L. Le Guyader, H.B. Braun
Building Blocks of an Artificial Kagome Spin Ice System
20th International Colloquium on Magnetic Films and Surfaces (ICMFS), Berlin, Germany, 20-24.07.2009

B. Henrich, J. Becker, R. Dinapoli, P. Goettlicher, H. Graafsma, H. Hirsemann, R. Klanner, H. Krueger, R. Mazzocco, A. Mozzanica, H. Perrey, G. Potdevinc, B. Schmitt, X. Shi, A. K. Srivastava, U. Trunk, C. Youngman
The Adaptive Gain Integrating Pixel Detector, a detector for the European XFEL.
11th International Workshop on Radiation Imaging Detectors, IWORID, Prague, Czech Republic, 28.06-02.07.2009

B. Henrich, A. Bergamaschi, R. Dinapoli. I. Jonson, A. Mozzanica, X. Shi, B. Schmitt
Radiation detector activities of the SLS Detectors Group at Paul Scherrer Institute
SPRING8 Seminar, Japan, 09.2009

J. Herzen, F. Beckmann, T. Donath, C. David, C. Grünzweig, F. Pfeiffer, A. Haibel, A. Schreyer
Differential phase-contrast setup for a non coherent beamline at HASYLAB using hard x-ray grating interferometer
DPG Frühjahrstagung, Dresden, Germany, 22-27.03.2009

C. Hintermüller
Evaluation of dose dependent structural changes in 3D brain micro-vasculature in response to heavy particle radiation exposure
11th international Congress of the IUPESM, Munich, Germany, 09-12.09.2009

T. Huthwelker, M. Hutterli, F. Enzmann, M. Ammann, M. Kersten, M. Stampanoni, F. Marone
Study of Ice using Synchrotron-based Microtomography
European Geoscience Union, General assembly 2009, Vienna, Austria, 19-24.04.2009

N.A. Kamenos, M. Cusak, T.Huthwelker, P. Lagarde, R.E. Scheibling
Mg-lattice Associations in red Coralline Algae
European Geoscience Union, General assembly 2009, Vienna, Austria, 19-24.04.2009

A.N. Kaufmann, S. Gubser, H. Burkard, H. Schift, E. Meyer, T.A. Jung
Quantitative assessments of interface strengths and fracture for nanotowers containing specific materials interfaces
3rd Vienna International Conference on Nanotechnology, Wien, Österreich, 18-20.3.2009

A.N. Kaufmann, H. Schift, E. Meyer, T.A. Jung
Fracture and wear of 'nanotowers'
12th International Conference on Fracture, Ottawa, Canada, 12-17.06.2009

A.N. Kaufmann, H. Schift, E. Meyer, T.A. Jung
Fracture and Wear of "Nanopillars" - Defined Fracture at Interfaces using Scanning Force Microscopy
Int. Colloquium Micro-Tribology, Milowka, Poland, 21-24.09.2009

A.N. Kaufmann, H. Schift, E. Meyer, T.A. Jung
The Fracture Behavior of Nanostructures
2009 MRS Fall Meeting, Boston, USA, 30.11-04.12.2009

M. Kerbrat, T. Huthwelker, A. Křepelová, T. Ulrich, T. Bartels-Rausch and M. Ammann
Flow Tube and molecular Level Spectroscopy studies of Nitrous, Nitric and Pernitric Acid Uptake on Ice
Fifth SCOUT-O3 Annual Meeting, Schliersee, Germany, 15-17.06.2009

C. M. Kewish
Characterization of the wavefield in the focus of reflective hard X-ray optics
SRI09: 10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 28.09–02.10.2009

A. Kleibert, A. Fraile-Rodriguez, J. Bansmann, F. Nolting
Magnetic coupling of single Fe nanoparticles to a ferromagnetic Co substrate
SLS Symposium on Magnetism in reduced dimension, Villigen, Switzerland, 03.03.2009

A. Kleibert, F. Bulut, K. Gebhardt, W. Rosellen, D. Sudfeld, J. Passig, J. Bansmann,
K.-H. Meiwes-Broer, M. Getzlaff
Correlation of shape and magnetic anisotropy of mass-filtered Fe and FeCo alloy nanoparticles supported by W(110)
DPG Frühjahrstagung 2009, Regensburg, Germany, 21-26.03.2009

A. Kleibert, A. Voitkans, K.-H. Meiwes-Broer
Spontaneous alignment of Fe nanoparticles deposited onto W(110)
DFG Abschlusskolloquium des SPP 1153, Hirschegg, Austria, 06-10.09.2009

E. Kleimenov, A. Bergamaschi, J. v. Bokhoven, M. Janousch, B. Schmitt, M. Nachtegaal
High-resolution hard-X-ray fluorescence spectrometer
14th International Conference on X-ray Absorption Fine Structure, Camerino, Italy, 26-31.7.2009

A. Křepelová, T. Huthwelker, M. Janousch, M. Ammann
X-ray Studies of Halogen Salt Impurities in Ice
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, University of Berne and Paul Scherrer Institut, Villigen, Switzerland, 03.04.2009

L. Le Guyader, A. Kleibert, and F. Nolting
GdFeCo measured with PEEM
FANTOMAS project meeting, York, United Kingdom, 04.2009

L. Le Guyader, A. Kleibert, and F. Nolting
Ultrafast nano-magnetism
FENOMENA kick-off meeting, Nijmegen, The Netherlands, 06.2009

L. Le Guyader, E. Mengotti, A. Kleibert, A. Tsukamoto, A. Itoh, L. Heyderman, A. Kirilyuk, A. Kimel, Th. Rasing, F. Nolting
Ultrafast all-optical magnetic switching in nano-structured GdFeCo thin films
Swiss Workshop on Materials with Novel Electronic Properties, Les Diablerets, Switzerland, 08.2009

J. Lobo-Checa, M. Matena, K. Müller, J.H. Dil, F. Meier, L. H. Gade , T. A. Jung, M.Stöhr
Electronic confinement and band formation originating from a supramolecular porous network
Trends in NanoTechnology (TNT), Barcelona, Spain, 09.2009

J. Lobo-Checa, M. Matena, K. Müller, J.H. Dil, F. Meier, L.H. Gade , T.A. Jung, M.Stöhr
Electronic confinement imposed by a supramolecular porous network: Band formation from coupled quantum dots
10th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures (ACSIN 10), Granada, Spain, 09.2009

J. Lobo-Checa, M. Matena, K. Müller, J.H. Dil, F. Meier, L.H. Gade, T.A. Jung, M. Stöhr
Band formation from coupled quantum dots formed by a nanoporous network on a copper surface
IV reunion de la asociación de usuarios de sincritrón de España (AUSE IV 2009), Barcelona, Spain, 09.2009

K. Mader, P. Schneider, R. Müller, J.P. Thiran, M. Stampanoni
Assessment of the Genetic Basis of Bone Ultrastructure
PhD Symposium, EMPA, Dübendorf, Switzerland, 19.11.2009

M. Matena, J. Lobo Checa, M. Wahl, M. Stöhr, T. A. Jung, T.-L. Lee, J. Zegenhagen, T. Riehm, L.H. Gade
Reactions on surfaces for the creation of stable templates
APS March meeting, Pittsburgh, USA, 03.2009

M. Matena, J. Lobo Checa, M. Wahl, M. Stöhr, T. A. Jung, T.-L. Lee, J. Zegenhagen, T. Riehm, L. H. Gade
Reactions on surfaces for the creation of stable templates
Workshop of the EU Marie Curie RTN PRAIRIES, Liverpool, UK, 04.2009

F. Meier, J. Lobo-Checa, V. Petrov, S. Guerrero, C. Mudry, L. Patthey, J. Osterwalder, H. Dil
Unconventional Fermi surface spin patterns in the (BiPbSb)/Ag(111) surface alloys
DPG, Dresden, Germany, 22-27.03.2010

E.Mengotti, L.J. Heyderman, A. Fraile Rodríguez, A. Bisig, F.Nolting, L. Le Guyader, H.B. Braun
Building Blocks of an Artificial Kagome Spin Ice System
International Conference on Magnetism (ICM), Karlsruhe, Germany, 26-31.07.2009

E.Mengotti, L.J. Heyderman, A. Fraile Rodríguez, A. Bisig, F.Nolting, L. Le Guyader, H.B. Braun
Building Blocks of an Artificial Kagome Spin Ice System
Swiss physical society and Österreichische Physikalische Gesellschaft Jahrestagung, Innsbruck, Austria, 02-04.09.2009

A. Menzel
Advanced Methods in Scanning X-Ray Microscopy
SPIE Scanning, Monterey, California, USA, 6.5.2009

A.Mozzanica, A. Bergamaschi, R. Dinapoli, H. Graafsma, B. Henrich, P. Kraft, I. Johnson, M. Lohmann, B. Schmitt, X. Shi
Characterization of an adaptive gain silicon microstrip readout chip.
11th European Symposium on Semiconductor Detectors (former 'Elmau Conference') Wildbad Kreuth, Germany, 07-11.06.2009

R. Mokso
Real-time tomography at the Swiss Light Source
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2010

R. Mokso
Wavefront Propagation in the Full-field Microscope with Square Beamshaping Condenser Lens
10th International Conference on Synchrotron Radiation InstrumentationWorkshop Developments in Coherent X-ray Methods, Melbourne, Australia, 27.09-02.10.2010

A. Mozzanica, A. Bergamaschi, R. Dinapoli, H. Graafsma, B. Henrich, P. Kraft, I. Johnson, M. Lohmann, B. Schmitt, X. Shi
A single photon resolution integrating chip for microstrip detectors.
11th International Workshop on Radiation Imaging Detectors, IWORID, Prague, Czech Republic 28.06-02.07.2009

K. Müller, A. Kara, A. Scheybal, R. Bertschinger, J. Osterwalder, T.A. Jung
Oxygen Induced Condensation and Phase-Transformation of Pentacene on Cu(110)
International Surface Science Conference (ISSC 17), Reading, UK, 30.03-04.04.2009

K. Nygard, D. K. Satapathy, J. Buitenhuis, E. Perret, O. Bunk, C. David, J. F. van der Veen
Local Structure of Colloidal Fluids in Extreme Confinement
SAS-2009, Oxford, United Kingdom, 13-18.09.2009

S. Neuhaus, C. Padeste, H.H. Solak, N.D. Spencer
Tailoring surface properties of fluoropolymers with structured polyelectrolyte brushes
European Polymer Congress EPF09, Graz, Austria, 12-17.07.2009

K. Nygard, D. K. Satapathy, J. Buitenhuis, E. Perret, O. Bunk, C. David, J. F. van der Veen
Ordering of Colloidal Fluids in Extreme Confinement
JUM@P 09, Villigen, Switzerland, 12-13.10.2009

V. Olieric, M. Wang, R. Bingel-Erlenmeyer, R. Schneider, C. Pradervand, W. Glettig, T. Tomizaki, E. Panepucci, V. Thominet, J. Gabadinho, E. Zimoch, A. Isenegger, C. Schulze-Briese
X06DA, a versatile protein crystallography beamline at the Swiss Light Source
Joint User's Meeting at PSI, Villigen PSI, Switzerland, 12.10.2009
23nd Rhine-Knee Regiomeeting, Leissigen, Switzerland, 09–11.09.2009

V.Olieric
Protein Crystallography beamlines: X06SA, X10SA, X06DA
Information Day on Large Facilities, Villigen PSI, Switzerland, 19.10.2009

B. Oswald, P. Leidenberger, S. Tsujino
Nano-optics for field emitter arrays Exploratory study to investigate the applicability of nano-optical
5th Workshop on Numerical Methods for Optical Nano Structures, ETH Zürich, Switzerland, 06-07.07.2009

C. Padeste, H.H. Solak, S. Neuhaus, P. Farquet
Lithographic radiation grafting using synchrotron light
European Polymer Congress EPF09, Graz, Austria, 12-17.07.2009

L. Patthey
K-Space and Q-Space Microscopy facilites at SLS
Shen Group Retreat 2009, Quaker Center, Ben Lomond, CA, USA, 31.08-02.09.2009

C. Pradervand
A Beam Profile Sensor for Synchroton Radiation Based on a CVD Diamond Membrane
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2009

C. Quitmann
Science and instrumentation at the Swiss Light Source
Seminar, Advanced Light Source, Lawrence Berkeley Lab, Berkeley, USA, 23.8.2009

C. Quitmann
New science through new instrumentation at the Swiss Light Source
IV REUNIÓN de la ASOCIACIÓN de USUARIOS de SINCROTRÓN de ESPAÑA (AUSE) Barcelona, Spain, 18.9.2009

C. Quitmann
STXM at the Swiss Light Source – and beyond
Inauguration of the Maxymus microscope, Helmholtzzentrum Berlin, Germany, 11.11.2009

C. Quitmann
X-ray microscopy an analytical tools for surface characterisation
CCMX Winter School, Surface Science: Fundamentals, Properties & Selected Applications, Diablertes, Switzerland, 27.1.2009

M. Radovic, C. Barone, A. Galdi, N. Lampis, L. Maritato, F. Miletto Granozio, S. Pagano, P. Perna, U. Scotti di Uccio
Origin of non-linear transport in $Pr_{0.7}Ca_{0.3}MnO_3$ thin films: the key role of charge density waves
I° Congresso Nazionale sugli Ossidi Funzionali per l'Elettronica FOxE - Functional Oxides for Electronics, Sorrento, Italy, 25-27.03.2009

M. Radovic, P. Perna, D. Maccariello, , U. Scotti di Uccio, F. Miletto Granozio, D. Marré, I. Pallecchi, M. Codda, C. Cantoni, M. Varela, J. Gasquez, S. Pennycook
Novel conducting interfaces between band insulating oxides
16th International Workshop on Oxide Electronics, Tarragona, Spain, 04-07.10 2009

S.S. Sarkar. M. Saidani, H. H. Solak. C. David., J. F. van der Veen
Holography in the extreme ultraviolet region: a new fabrication technique for high resolution zone plates
9th IEEE Conference on Nanotechnology, Genova, Italy, 26-30.03.2009

S.S. Sarkar, H. H. Solak. C. David, J. F. van der Veen
25nm resolution Fresnel zone plate fabrication using extreme ultraviolet holography
35th International Conference on Micro and Nano Engineering (MNE 09), Gent, Belgium, 28.09-01.10.2009

Y. Sassa, M. Radović, M. Månsson, X. Cui, S. Pailhès, E. Razzoli, S. Guerrero, M. Shi, P. Willmott, F. Miletto Granozio, J. Mesot, L. Patthey
First ARPES results on $YBa_2Cu_3O_{7-x}$ films grown by PLD
MaNEP, Martin Peter Colloquim, Uni Geneva, Switzerland, 19.06.2009

Y. Sassa, M. Radović, M. Månsson, X. Cui, S. Pailhès, E. Razzoli, S. Guerrero, M. Shi, P. Willmott, F. Miletto Granozio, J. Mesot, L. Patthey
First ARPES results on $YBa_2Cu_3O_{7-x}$ films grown by PLD
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09, ETHZ, Zürich, Switzerland, 19-24.07.2009

Y. Sassa, M. Radović, M. Månsson, X. Cui, S. Pailhès, E. Razzoli, S. Guerrero, M. Shi, P. Willmott, F. Miletto Granozio, J. Mesot, L. Patthey
First ARPES results on $YBa_2Cu_3O_{7-x}$ films grown by PLD
JUM@P, PSI, Villigen, Switzerland, 12-13.10.2009

Y. Sassa, M. Radović, M. Månsson, X. Cui, S. Pailhès, E. Razzoli, S. Guerrero, M. Shi, P. Willmott, F. Miletto Granozio, J. Mesot, L. Patthey
First ARPES results on $YBa_2Cu_3O_{7-x}$ films grown by PLD
EMPA PhD Symposium, EMPA Dübendorf, Switzerland, 19.11.2009

H. Schift, K. Hellbernd, A. Schleunitz, C. Spreu, J. Ziegler, J.-J. Lee
Shape control of polymer reflow structures fabricated by nanoimprint lithography
NNT2009, Int. Conference on Nanoimprint and Nanoprint Technology, San Jose, CA, USA 11-13.11.2009

J. Schlappa, T. Schmitt, F. Vernay, V. N. Strocov, V. Ilakovac, B. Thielemann, H. M. Ronnow, Vanishri S., A. Piazzalunga, X. Wang, L. Braicovic, G. Ghiringhelli, C. Marin, J. Mesot, B. Delley, L. Patthey
Collective spin-excitations in a quantum spin ladder probed by high-resolution resonant inelastic x-ray scattering
2009 APS March Meeting, Pittsburgh, USA, 16-20.03.2009

J. Schlappa, T. Schmitt, K. Zhou, V. N. Strocov, F. Vernay, B. Delley, B. Thielemann, J. Mesot, L. Patthey, V. Ilakovac, H. M. Ronnow, X. Wang, M. Grioni, G. Ghiringhelli, A. Piazzalunga, C. Dallera, L. Braicovic, Vanishri S., C. Marin
Collective spin-excitations in low-dimensional spin systems probed by high-resolution resonant inelastic x-ray scattering
MaNEP Topical Meeting, Geneve, Switzerland, 17.06.2009

J. Schlappa, T. Schmitt, K. Zhou, V. N. Strocov, F. Vernay, B. Delley, B. Thielemann, J. Mesot, L. Patthey, V. Ilakovac, H. M. Ronnow, X. Wang, M. Grioni, G. Ghiringhelli, A. Piazzalunga, C. Dallera, L. Braicovic, Vanishri S., C. Marin
Collective spin-excitations in low-dimensional spin systems probed by high-resolution resonant inelastic x-ray scattering
XAFS 14 Conference, Camerino, Italy, 26-31.07.2009

J. Schlappa, T. Schmitt, F. Vernay, V. N. Strocov, V. Ilakovac, B. Thielemann, H. M. Ronnow, Vanishri S., A. Piazzalunga, X. Wang, L. Braicovic, G. Ghiringhelli, C. Marin, J. Mesot, B. Delley, L. Patthey
Collective spin-excitations in low-dimensional spin systems probed by high-resolution resonant inelastic x-ray scattering
Joint Annual SPS and ÖPS Meeting, Innsbruck, Austria, 02-04.09.2009

A. Schleunitz, R. Truckenmüller, M. Reinhardt, S. Giselbrecht
Fabrication of 3D cell containers with integrated topography by combined microscale thermoforming and thermal nanoimprint
8th Int. Conf.on Nanoimprint and Nanoprint Technology, San Jose, CA, USA, 11-13.11.2009

T. Schmidt
The pulsed wire magnetic measurement system
International Magnetic Measurement Workshop IMMW 16, Bad Zurzach, Switzerland, 26-29.10.2009

B. Schmitt, A. Bergamaschi, A. Cervellino, R. Dinapoli. F. Gozzo, B. Henrich, I. Jonson, A. Mozzanica, X. Shi
Mythen: powder diffraction made orders of magnitudes faster
Soleil Seminar, France, 03.2009

T. Schmitt, J. Schlappa, F. Vernay, V. N. Strocov, V. Ilakovac, B. Thielemann, H. M. Ronnow, J. Mesot, B. Delley, L. Patthey
Collective spin-excitations in Cu L and O K edge Resonant Inelastic X-ray Scattering from $Sr_{14}Cu_{24}O_{41}$
DPG Frühjahrstagung der Sektion Kondensierte Materie, Dresden, Germany, 22-27.03.2009

X. Shi, R. Dinapoli, B. Schmitt, U. Trunk, H. Krüger
Challenge in chip design for the AGIPD detector
11th European Symposium on Semiconductor Detectors (former 'Elmau Conference'), Wildbad Kreuth, Germany, 07-11.06.2009

M. Shi, A. Bendounan, E. Razzoli, S. Rosenkranz, M. R. Norman, J. C. Campuzano, J. Chang, M. Mansson, Y. Sassa, T. Claesson, O. Tjernberg, L. Patthey, N. Momono, M. Oda, M. Ido, S. Guerrero, C. Mudry, Joel Mesot
The dichotomy of the dispersion in the pseudogap phase of cuprates as studied by ARPES
International Workshop on Strong Correlation and Angle-Resolved Photoemission Spectroscopy, CORPES09, Zürich, Switzerland, 19-24.07.2009

M. Stampanoni
Advanced X-ray Phase Contrast Tomographic Imaging with a Grating Interferometer
IEEE-MIC-2009 Conference, Orldando, USA, 29.10.2009

U. Staub, Y. Bodenthin, C. Piamonteze, M. García-Fernández, R. De Souza, M. Garganourakis, V. Scagnoli, S. Koohpayeh, D. Fort, S. W. Lovesey
Discovery of strange atomic multipoles (parity and time odd) in magneto-electric $GaFeO_3$
MaNEP meeting, Les Diablarets, Switzerland, 26-28.8.2009

M. Stöhr, M. Matena, M. Wahl, T.A. Jung, J. Zegenhagen, L.H. Gade
Reactions on surfaces for the creation of template structures
Spring meeting of the DPG, Dresden, Germany, 03.2009

M. Stöhr, J. Lobo-Checa, M. Matena, K. Müller, T.A. Jung, H. Dil, L.H. Gade
Electronic confinement imposed by a nanoporous network: Band formation from coupled quantum dots
26th European Conference on Surface Science (ECOSS), Parma, Italy, 09.2009

M. Stöhr, M. Matena, J. Lobo-Checa, M. Wahl, H. Dil, L.H. Gade, T.A. Jung, J. Zegenhagen
Electronic confinement imposed by a nanoporous supramolecular network
AVS 56th International Symposium and Exhibition, San Jose, USA, 11.2009

S. Tsujino, E. Kirk, T. Vogel, J. Gobrecht
Four-terminal field-emission characteristics of double-gate metallic field-emiter array cathodes with controlled apex sizes fabricated by molding and self-aligned gate process
Tenth International Vacuum Electronics Conference, Rome, Italy, 28-30.04.2009

J.F. van der Veen
Introduction to the SLS
Visit ABB Switzerland, Baden, PSI, Villigen, Switzerland, 26.01.2009

J.F. van der Veen
Welcome address
Visit ETH Magnetism Group, PSI, Villigen, Switzerland, 25.02.2009

J.F. van der Veen
Introduction to the SLS
Visit Siemens Schweiz AG, PSI, Villigen, Switzerland, 16.06.2009

J.F. van der Veen
Introduction to the SLS
Visit Aargauer Regierungsrat, PSI, Villigen, Switzerland, 01.07.2009

J.F. van der Veen
Introduction to the SLS
Visit Vizerektorat Forschung & Nachwuchsförderung Universität Basel, PSI, Villigen, Switzerland, 17.09.2009

J.F. van der Veen
Introduction to the SLS
Visit Jürg Burri, Staatssekretariat für Bildung und Forschung SBF, PSI, Villigen, Switzerland, 08.10.2009

S. Vijayaraghavan, M. Matena, A. Llanes-Pallas, M. Enache, J. Wiss, T.A. Jung, D. Bonifazi, M. Stöhr
Conformation controlled networking of H-bonded assemblies on surfaces
Trends in NanoTechnology (TNT), Barcelona, Spain, 09.2009

J. Vila-Comamala, K. Jefimovs, J. Raabe, M. Dierolf, C. Kewish, P. Thibault, V. Guzenko, G. Tzvetkov, T. Pilvi, M. Ritala, C. David
Ultrahigh Resolution X-Ray Fresnel Zone Plates by Thin Film Deposition
EIPBN 2009, Marco Island, Florida, USA, 26-29.05.2009

J. Vila-Comamala, S. Gorelick, K. Jefimovs, J. Raabe, M. Dierolf, C. M. Kewish, P. Thibault, V. A. Guzenko, M. Stampanoni, R. Mokso, F. Marone, T. Pilvi, M. Ritala, C. David
Advanced Diffractive Optics for X-ray Microscopy
XMNP 2009, Palinuro, Italy, 18-21.06.2009

J. Vila-Comamala, M. Dierolf, C. M. Kewish, P. Thibault, T. Pilvi, E. Färm, V. Guzenko, S. Gorelick, A. Menzel, O. Bunk, M. Ritala, F. Pfeiffer, C. David
High Resolution STXM at 6.2 keV Photon Energy
ICXOM20, Karlsruhe, Germany, 15-18.09.2009

T. Weitkamp, I. Zanette, P. Tafforeau, C. David, S. Rutishauser, T. Donath, O. Bunk, F. Pfeiffer, E. Reznikova, J. Mohr, and V. Altapova
X-ray grating interferometry at ESRF-ID19
Coherence 2009 Workshop, Melbourne, Australia, 02-04.10.2009

C. Wäckerlin, D. Chylarecka, K. Müller, N. Ballav, T. Kim, F. Nolting, T. A. Jung
Growth and magnetic properties of metallo-porphyrins on magnetic substrates
Österreichische Physikalische Gesellschaft, Swiss Physical Society, Österreichische Gesellschaft für Astronomie und Astrophysik: Gemeinsame Jahrestagung, 2009, Innsbruck, Austria, 02-04.09.2009

M. Wang
Automation and Recent Development at SLS PX Beamlines
CCP4 Study Weekend, Nottingham, UK, 03.01.2009

M. Wang
Phosphor-SAD Phasing as a General Tool for Solving Nucleic Acid Structure?
American Crystallographic Association Annual Meeting, Toronto, Canada, 29.07.2009

M. Wang
Automation at SLS Protein Crystallography Beamlines: from Crystallization to Structure Determination
Joining Forces Symposium, Zurich, Switzerland, 20.11.2009

J. Wiss, T. Samuely, T. Voigt, J. Hornung, M. Enache, N. Wintjes, J. Lobo-Checa, F. Diederich, T.A. Jung, M. Stöhr
Self-assembly of a large porphyrin derivative containing pentafluoro-phenyls studied by STM on Ag(111) and Cu(111)
Annual meeting of the Swiss Physical Society (SPS), Innsbruck, Austria, 09.2009

V. Zelenay, T. Huthwelker, A. Křepelová, M. Birrer, M. Ammann
Observation of Water Uptake in Aerosol Particles using microspectroscopy
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, University of Berne, Switzerland, 03.04.2009

V. Zelenay, A. Křepelová, M. Birrer, T. Tritscher, R. Chirico, T. Huthwelker and M. Ammann
Water Uptake in single Soot Particles- an X-ray Microspectroscopy Study
ETH Seminar, Zurich, Switzerland, 02.12.2009

K. J. Zhou, T. Schmitt, J. Schlappa, F. Vernay, V.N. Strocov, B. Delley, L. Patthey
The Metal-Insulator-Transition in Vanadium oxides investigated by Resonant Inelastic X-ray Scattering
Joint Annual Meeting of the Austrian Physcial Society and the Swiss Physcial Society, Innsbruck, Austria, 02-04.09.2009

K. J. Zhou, T. Schmitt, F. Vernay, J. Schlappa, V. N. Strocov, B. Delley, L. Patthey
The Metal-Insulator-Transition in VO_2 investigated by Resonant Inelastic X-ray Scattering
14th International Conference on X-ray Absorption Fine Structure, Camerino, Italy, 27-31.07.2009

K. J. Zhou, T. Schmitt, F. Vernay, J. Schlappa, V. N. Strocov, B. Delley, L. Patthey
The Metal-Insulator-Transition in VO_2 investigated by Resonant Inelastic X-ray Scattering
Resonant Inelastic X-ray Scattering Workshop, ESRF Grenoble, France, 29.06-01.07.2009

POSTERS

M. Ammann, A. Rouvière, Y. Sosedova, C. George, B. D'Anna, V. Zelenay, A. Křepelová, T. Huthwelker
Microchemistry and microstructure of organic particles
EUCAARI Annual Meeting, Stockholm, Sweden, 16-20.11.2009

V. Auzelyte, M. Saidani, P.K. Sahoo, S.S. Sarkar, C. David, J. Gobrecht, H.H. Solak
Nanopatterning with Extreme Ultraviolet Interference Lithography
Trends in Nanoscience 2009, Kloster Irsee, Germany, 28.02-04.03.2009

V. Auzelyte, H. Sigg, B. Schmitt, A. Savouchkina, A. Foelske-Schmitz, H.H. Solak
ZnO films and nanostructures formed from chemical solution by annealing and EUV exposures
Trends in Nanoscience 2009, Kloster Irsee, Germany, 28.02-04.03. 2009

V. Auzelyte, A. Langner, H.H. Solak,
Thermal development of a calixarene resist
53rd Internation conference on electron, photon and ion beam technology and nanofabrication, Marco Island, USA, 29.05-02.06.2009

M. Bech, T.H. Jensen, R. Feidenhans'l, F. Pfeiffer, O. Bunk, C. Grünzweig, T. Donath, C. David
X-ray Phase Contrast and Dark-Field Imaging
Application of X-ray Synchrotron Radiation in Chemistry, Physics and Biology, Sønderborg, Denmark, 27.06-03.07.2009

P. Beaud, S.L. Johnson, E. Vorobeva, U. Staub, R.A. De Souza, C.J. Milne, Q. X. Jia, G. Ingold
Structural response to ultrafast melting of charge and orbital order in a manganite
Swiss Workshop on Materials with Novel Electronic Properties, Les Diablerets, Switzerland, 26-28.08.2009

M. Bednarzik, T. Donath, C. Grünzweig, W. Groot, B. Haas, C. David
Fabrication of High Aspect Ratio Diffraction Gratings with DRIE for X-ray Phase Contrast Imaging
HARMST 2009, International Workshop on High Aspect Ratio Micro Structure Technology, Saskatoon, Canada, 25-28.06.2009

A. Bergamaschi, A. Mozzanica, R. Dinapoli, B. Henrich, I. Johnson, P. Kraft, P. Roos, B. Schmitt, D. Suter, X. Shi
Characterization of thick silicon microstrip sensors for hard X-ray applications
11th International Workshop on Radiation Imaging Detectors, Prague, Czech Republic, 28.06-02.07.2009

R. Bingel-Erlenmeyer, V. Olieric, M. Wang, C. Schulze-Briese
A Crystallization Platform enabling Automated in situ Diffraction Screening
VIII European Symposium of the Protein Society, Zurich, Switzerland, 14-18.6.2009

R. Bingel-Erlenmeyer, V. Olieric, M. Wang, C. Schulze-Briese
A Crystallization Platform enabling Automated in situ Diffraction Screening
7th International NCCR Sympoium on New Trends in Structural Biology, Zurich, Switzerland, 07-08.9.2009

R. Bingel-Erlenmeyer, V. Olieric, M. Wang, C. Schulze-Briese
A Crystallization Platform enabling Automated in situ Diffraction Screening
Protein Structure Determination in Industry, Basel, Switzerland, 08-10.11.2009

A. Bodi, N. S. Shuman, T. Baer, B. Sztaray, M. Johnson, T. Gerber
Dissociative photoionization of energy-selected CH_3I^+: iPEPICO at the VUV beamline of the SLS
Gaseous Ions: Structures, Energetics & Reactions Gordon Conference, Galveston TX, USA, 01–06.03.2009

J.J. Boon, J. van der Horst, E.S.B. Ferreira, F. Marone, M. Stampanoni
X-ray tomographic microscopy compared to ion polished paint cross sections of 19th century paints with and without metal soap aggregates
Interdisciplinary Symposium on 3D Microscopy, Interlaken, Switzerland, 12-16.07.2009

J.J. Boon, J. van der Horst, F. Marone, M. Stampanoni
Biomaterial Science: the self-assembling avian eggshell as model
FOM Physics days, Veldhoven, The Netherlands, 20-21.01.2009

S. Borkar, A. Bodi, B. Sztaray
iPEPICO Studies on the Energetics of Atmospherically Relevant $S_xO_yCl_z$ Ions
Asilomar Conference on Mass Spectrometry, Pacific Grove CA, USA, 16–20.10.2009

D. Chylarecka, T. Kim, K. Müller, Ch. Wäckerlin, E. Meyer, N. Ballav, F. Nolting, T. Jung
Growth and magnetic properties of metallo-porphyrins on magnetic substrates
8th PSI Summer School on Condensed Matter Research, Zuoz, Switzerland, 01-07.08.2009

L.J. Clarke, A.A. Finch, T. Huthwelker, L.C. Foster, H.A. Kennedy, C.A. Richardson, H. Steaggles
XANES determination of Magnesium Speciation in Shells of two marine bivalve Molluscs
European Geoscience Union, General assembly 2009, Vienna, Austria, 19-24.04.2009

X. Cui
Evolution of electronic structure on Transition Metal doped Titanium Disulfide by angle-resolved photoemission spectroscopy
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09, Zurich, Switzerland, 19-24.07.07.2009

X. Cui
Final-state effects in high-resolution angle-resolved photoemission from magnetic single crystal
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09, Zürich, Switzerland, 19-24.07.2009

X. Cui
Final-state effects in high-resolution angle-resolved photoemission from magnetic single crystal
The International Conference on Magnetism (ICM), Karlsruhe, Germany, 26-31.07.2009

X. Cui
Final-state effects in high-resolution angle-resolved photoemission from magnetic single crystal
First Joint Users' Meeting @ PSI: JUM@P '09, Paul Scherrer Institut, Switzerland, 12-13.10.2009

H. Dil, F. Meier, J. Lobo-Checa, L. Patthey, G. Bihlmayer, J. Osterwalder
Rashba type spin orbit splitting of quantum well states in thin Pb films
3S St. Moritz, Switzerland, 12.03.2009

T. Donath, F. Pfeiffer, O. Bunk, M. Bednarzik, C. Grünzweig, E. Hempel, S. Popescu, M. Hoheisel, C. David
Phase-contrast imaging and tomography at 60 keV using a conventional x-ray tube source
Interdisciplinary Symposium on 3D Microscopy 2009, Interlaken, Switzerland, 12-16.07.2009

J. Eller, F.N. Büchi, S. McDonald, F. Marone, M. Stampanoni, A. Wokaun
Visualization of insitu liquid water distribution of polymer electrolyte fuel cells using x-ray micro tomography
First Joint Users' Meeting @ PSI, Villigen, Switzerland, 12-13.10.2009

J. Eller, F.N. Büchi, R. Flückiger, M. Stampanoni, S. McDonald, F. Marone, D. Tehlar, A. Wokaun
X-ray Micro Tomography Study of Liquid Water in Gas Diffusion Layers of Polymer Eletcrolyte
Interdisciplinary Symposium on 3D Microscopy, Interlaken, Switzerland, 01.02-16.07.2009

M. Enache, M. Matena, A.L.Pallas, T. Jung, J. Wouters, B. Champagne, D. Bonifazi, M. Stöhr
Conformation-controlled networking of H-bonded assemblies on surfaces
SAOG meeting, Fribourg, Switzerland, 01.2009

M. Enache, M. Matena, J.L.Checa, M. Stöhr, K. Müller, T. Jung, T. Riehm, L.H. Gade
Thermally induced polymerization of a perylene derivative on a Cu-substrate
Trends in Nanoscience Workshop, Kloster Irsee, Germany, 02.2009

M. Enache, M. Matena, J.L.Checa, M. Stöhr, K. Müller, T. Jung, T. Riehm, L.H. Gade
Thermally induced polymerization of a perylene derivative on a Cu-substrate
Swiss Nanoscience Conference, Basel, Switzerland, 05.2009

U. Flechsig, J. Als-Nielsen, A. Jaggi, J. Krempasky, P. Oberta, S. Spielmann, J. F. van der Veen
X-ray Experiments for Students at the SLS Optics Beamline
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2010

U. Flechsig, F. Nolting, A. Fraile Rodriguez, J. Krempasky, C. Quitmann, T. Schmidt, S. Spielmann, D. Zimoch
Performance measurements at the SLS SIM beamline
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2010

A. Fraile Rodríguez, A. Kleibert, F. Nolting, J. Bansmann, L.J. Heyderman
X-ray spectromicroscopy of magnetic single nanocrystals
Joint Users Meeting @ PSI (JUM@P 2009), Villigen, Switzerland, 12-13.10.2009

A. Fraile Rodríguez, L. Joly, M. B. Holcomb, L W. Martin, A. Scholl, Y. H. Chu, E. Arenholz, C.-H. Yang, S. Y. Yang, T. Conry, Q. He, R. Ramesh
Nanoscale Observation of Order Parameter Coupling in Multiferroic BiFeO3 Thin Films
2009 Swiss Workshop on Materials with Novel Electronic Properties, Les Diablerets, Switzerland, 26-28.08.2009

M. Ghahari, A.J Davenport, T. Rayment, T. Suter, C. Padovani, M. Stampanoni, R. Mokso
Synchrotron Studies of Stainles Steel Pitting Corrosion
Corrosion Science Symposiun, Manchaster, UK, 2009

W. Glettig, S. Henein, J-M. Breguet; C. Schulze-Briese
PRIGO: Parallel Robotics Inspired Goniometer for Protein Crystallography
9th euspen International Conference, San Sebastian, Spain, 02-05.06.2009

S. Gorelick, J. Vila-Comamala, V. Guzenko, R. Mokso, M, Stampanoni, C. David
Direct e-beam writing of high aspect ratio structures in PMMA: a tool for diffractive X-ray optics fabrication
35th International Conference on Micro and Nano Engineering (MNE 09),Ghent, Belgium, 28.09-02.10.2009

S. Gorelick, J. Vila-Comamala, M. Bednarzik, K. Nygård, B.D. Patterson, C. David
Investigation of damage in diffractive gratings induced by high power X-rays
20th International Congress on X-ray Optics and Microanalysis, Karlsruhe, Germany, 14-18.09.2009

D. Grolimund, D. Günther, C.N. Borca, H. Wang, L. Van Loon, M. Stampanoni, F. Marone, R. Mokso, N. Diaz, A. Jakob, K. Barmettler, B. Aeschlimann, P. Wersin, S.M. Heald
Evolution of Reactive Transport Plumes: Decipher physico-chemical micro-complexity using micro-Spectroscopy, chemical micro-Imaging, and micro-Tomography
20th International Conference on X-Ray Optics and Microanalysis, Karlsruhe, Germany, 15-17.09.2009

D. Grolimund, D. Günther, C.N. Borca, L. Van Loon, M. Stampanoni, F. Marone, K. Barmettler, B. Aeschlimann, P. Wersin, S.M. Heald
Contaminant transport in complex heterogeneous geological media: new insights through micro-imaging and micro-spectroscopy
Goldschmidt 2009 - "Challenges to Our Volatile Planet", Davos, Switzerland, 21-26.06.2009

J. Herzen, F. Beckmann, T. Donath, M. Ogurreck, C. David, F. Pfeiffer, S. Riekehr, A. Haibel, M. Müller, A. Schreyer
Differential phase-contrast imaging at the non-coherent high energy materials science beamline HARWI II
Interdisciplinary Symposium on 3D Microscopy, Interlaken, Switzerland, 12-17.07.2009

C. Hintermüller, J. S. Coats, A. Obenaus, G. Nelson, T. Krucker, M. Stampanoni
Evaluation of dose dependent structural changes in 3D brain micro-vasculature in resonse to heavy particle radiation exposure
Heavy Ions in Therapy and Space Symposium, Cologne, Germany, 06-10.07.2009

C. Hintermüller, J. S. Coats, A. Obenaus, G. Nelson, T. Krucker, M. Stampanoni
Evaluation of dose dependent structural changes in 3D brain micro-vasculature in resonse to heavy particle radiation exposure
JUM@P09, Joint PSI users meeting 2009, Villigen PSI, Switzerland, 12-13.10.2009

T. Huthwelker, A. Krepelova, V. Zelenay, T. Bartels-Rausch, M. Janousch, M. Ammann
X-Ray Spectroscopy of frozen Salt Solutions: Are Inclusions solid or liquid below the eutectic Temperature?
European Geoscience Union, General assembly 2009, Vienna, Austria, 19-24.04.2009

T. Huthwelker, R. Wetter, Ch. Frieh, M. Janousch
PHOENIX: A new soft X-Ray Microspectroscopy Beamline for Geo- and Environmental Sciences at the Swiss Light Source
European Geoscience Union, General assembly 2009, Vienna, Austria 01.09-24.04.2009

T. Huthwelker, A. Krepelova, T. Bartels-Rausch, M. Janousch, M. Ammann
X-Ray spectroscopy of frozen Salt Solutions: The liquid Nature of ions in frozen Salt solutions at temperatures below the eutectic temperature
14th International Conference on X-ray Absorption Fine Structure, Camerino, Italy, 26-31.07.2009

T. Huthwelker, A. Krepelova, T. Bartels-Rausch, V. Zelenay, M. Janousch, M. Ammann
The aqueous Nature of Ions in frozen Salt Solutions at Temperatures below the eutectic Temperature
JUM@P'09 Joint Users' Meeting at PSI, Villigen, Switzerland, 12-13.10.2009

T. Huthwelker, R. Wetter, C. Frieh, M. Janousch
The PHOENIX: A new Microspectroscopy Beamline for medium Energies (400-8000 eV) at the Swiss Light Source
JUM@P'09 Joint Users' Meeting at PSI, Villigen, Switzerland, 12-13.10.2009

T. Huthwelker, F. Enzmann, M.A. Hutterli, S.Maus, R. Mokso, M. Stampanoni, F. Marone, C. Hintermüller, M.M. Miedaner, J.-O. Schwarz, M. Ammann, M. Kersten
Synchrotron X-ray micro tomography on artificial frost flowers, frozen solutions and natural sea ice
First Joint Users' Meeting @ PSI, Villigen, Switzerland, 12-13.10.2009

T.H. Jensen, M. Bech, O. Bunk, T. Donath, C. David, R. Feidenhans'l, F. Pfeiffer
Directional X-ray Dark-Field Imaging
DANSCATT annual meeting, Lyngby, Denmark, 02-03.06.2009

S. Jha, Z. Ahmed, Y. Jeyaram, Y. Ekinci, J.F. Löffler
Deep-ultraviolet surface-enhanced resonance Raman spectroscopy of DNA bases
5th Workshop on Numerical Methods for Optical Nano Structures, Zurich, Switzerland, 06-07.07.2009

M. Johnson, A. Bodi, T. Gerber
A new VUV beamline at the Swiss Synchrotron Light Source for the Study of Chemical Dynamics
Gaseous Ions: Structures, Energetics & Reactions Gordon Conference, Galveston TX, USA, 01–06.03.2009

A.N. Kaufmann, S. Gubser, H. Schift, H. Burkard, E. Meyer, T.A. Jung
Interface strengths and fracture behaviour of nanotowers – A new versatile way for testing adhesion and related phenomena
NanoTechDay, Aarau, Switzerland, 20.5.2009

A.N. Kaufmann, S. Gubser, H. Schift, H. Burkard, E. Meyer, T.A. Jung
Interface strengths and fracture behaviour of nanotowers – A new versatile way for testing adhesion and related phenomena
Interdisciplinary Symposium on 3D Microscopy 2009, Interlaken, Switzerland, 12-16.7.2009

A.N. Kaufmann, H. Schift, E. Meyer, T.A. Jung
Measurement of mechanical strength of interfaces in nanopillars
NNT2009, International Conference on Nanoimprint and Nanoprint Technology, San Jose, CA, USA, 11-13.11.2009

C.M. Kewish, P. Thibault, M. Dierolf, O. Bunk, A. Menzel, J. Vila-Comamala, K. Jefimovs, F. Pfeiffer
Characterization of the complex wavefield in the focus of reflective hard X-ray optics
Interdisciplinary Symposium on 3D microscopy, Interlaken, Switzerland, 12-16.07.2009

C.M. Kewish, P. Thibault, M. Dierolf, O. Bunk, A. Menzel, J. Vila-Comamala, K. Jefimovs, F. Pfeiffer
Characterization of the complex wavefield in the focus of reflective hard X-ray optics
Gordon Research Conference on X-ray Science, Maine, USA, 02-07.08.2009

C.M. Kewish, P. Thibault, M. Dierolf, O. Bunk, A. Menzel, J. Vila-Comamala, K. Jefimovs, F. Pfeiffer
Ptychographic characterization of the wavefield in the focus of reflective hard X-ray optics
JUM@P09: Joint User Meeting at PSI, Villigen, Switzerland, 12.10.2009

E. Kirk, T. Vogel, K. Vogelsang, J. Krbanjevic, H. Schift, J. Gobrecht, S. Tsujino
Ag-Ag diffusion-bonded substrate for high current density field emitter arrays
Innovations in Thin Film Processing and Characterization 2009, Nancy, France, 17-20.11.2009

S.A. Klapp, F. Enzmann, P. Walz, T. Huthwelker, K.C. Hester, X. Zhang, E. Peltzer, R. Mokso, F. Marone, Ch. Hintermüller, S. McDonald, R. Mokso, G. Mikuljan, A.Isenegger, M. Stampanoni
Multiscale and multimodal X-ray tomographic microscopy at TOMCAT
First Joint Users' Meeting @ PSI, Villigen, Switzerland, 12-13.10.2009

S.A. Klapp, F. Enzmann, P. Walz, T. Huthwelker, K.C. Hester, X. Zhang, E. Peltzer, R. Mokso, J.-O. Schwarz, T. Pape, S. Hemes, A. Hiruta, G. Bohrmann, F. Marone, M. Stampanoni, M. Kersten, W.F. Kuhs, P.G. Brewer
Synchrotron X-ray tomography reveals the sequence of in situ gas hydrate formation from open ocean experiments
First Joint Users' Meeting @ PSI, Villigen, Switzerland, 12-13.10.2009

J. Krempasky, U. Flechsig, T. Korhonen, D. Zimoch, Ch. Quitmann, F. Nolting
Synchronized monochromator and insertion device energy scans at SLS
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2010

A. Křepelová, M. Ammann, T. Huthwelker, J.T. Newberg, H. Bluhm
X-ray Photoelectron Spectroscopy of Halogen Salt Impurities in Ice
JUM@P'09: Joint Users' meeting at PSI, PSI, Villigen, Switzerland, 12-13.10.2009

A. Křepelová, M. Ammann, J.T. Newberg, H. Bluhm, T. Huthwelker
Impact of strong Acids on Ice Surface melting studied by XPS and NEXAFS
Advanced Light Source Users' Meeting Lawrence Berkeley National Laboratory, Berkeley, USA, 15-17.10.2009

A Krepelova, M. Ammann, J.T. Newberg, H. Bluhm, T. Huthwelker
The Effect of strong Acids on the Ice-Air Interface studied by X-Ray Photoelecton Spectroscopy
European Geoscience Union, General assembly 2009, Vienna, Austria, 19-24.04.2009

A. Langner, H. H. Solak, V. Auzelyte, Y. Ekinci, C. David, J. Gobrecht, R. Gronheid, E. Van Setten, K. van Ingen Schenau, K. Feenstra
EUV resist contrast loss determination using interference lithography
International Symposium on Extreme Ultraviolet Lithography, Prague, Czech Republic, 18-21.10.2009

L. Le Guyader, E. Mengotti, A. Kleibert, L. Heyderman, A. Tsukamoto, A. Itoh, A. Kirilyuk, A. Kimel, Th. Rasing, F. Nolting
Towards ultrafast all-optical magnetic switching in nano-structured GdFeCo thin films
Joint FANTOMAS/UltraMagnetron school/workshop, Nijmegen, The Netherlands, 10.2009

F. Luo, L.J. Heyderman, G. Tzvetkov, J. Raabe, C.J. Jia, L.D. Sun, Z.G. Yan, C.H. Yan, K. Zheng, X.D. Han, Z. Zhang, M. Takano, N. Hayashi, M. Eltschka, M. Kläui, U. Rüdiger, T. Kasama, L. Cervera-Gontard, R. E. Dunin-Borkowski
Large scale synthesis of single crystalline iron oxide magnetic nanorings
International Conference on Magnetism (ICM), Karlsruhe, Germany, 26-31.07.2009

F. Luo, L.J. Heyderman, G. Tzvetkov, J. Raabe, C.J. Jia, L.D. Sun, Z.G. Yan, C.H. Yan, K. Zheng, X.D. Han, Z. Zhang, M. Takano, N. Hayashi, M. Eltschka, M. Kläui, U. Rüdiger, T. Kasama, L. Cervera-Gontard, R. E. Dunin-Borkowski
Large scale synthesis of single crystalline iron oxide magnetic nanorings
Joint User Meeting PSI (JUMP09), Paul Scherrer Institute, Villigen, Switzerland, 12-13.10.2009

K. Mader, P. Schneider, R. Müller, J.P. Thiran, M. Stampanoni
Ultrastructural Bone Phenomics using High-throughput Synchrotron-based X-Ray Tomography
Joint Users Meeting, Paul Scherrer Institute; Villigen, Switzerland, 13.10.2009

K. Mader, P. Schneider, R. Müller, J.P. Thiran, M. Stampanoni
Ultrastructural Bone Phenomics using High-throughput Synchrotron-based X-Ray Tomography
CIMST Summer School on Bio-medical Imaging, ETH Zürich; Hönggerberg, Switzerland, 28.08.2009

K. Mader, P. Schneider, R. Müller, J.P. Thiran, M. Stampanoni
Ultrastructural Bone Phenomics using High-throughput Synchrotron-based X-Ray Tomography
Interdisciplinary Symposium on 3D Microscopy, SSOM, Interlaken, Switzerland, 15.07.2009

K. Mader, P. Schneider, R. Müller, J.P. Thiran, M. Stampanoni
White Light Microscopy to Enable Genome-Scale Studies of Bone Ultrastructure
CIMST Symposium on Light Microscopy, ETH Zürich; Hönggerberg, Switzerrland, 13.01.2009

F. Marone, C. Hintermüller, R. Geus, B. Münch, P. Trtik, M. Stampanoni
Towards real time tomography: fast reconstruction algorithms
First Joint Users' Meeting @ PSI, Villigen, Switzerland, 12-13.10.2009

F. Marone, R. Mokso, S.A. McDonald, G. Mikuljan, A. Isenegger, C. Hintermüller, M. Stampanoni
Multiscale and multimodal tomographic microscopy at TOMCAT
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2010

F. Marone, Ch. Hintermüller, S. McDonald, R. Mokso, G. Mikuljan, A. Isenegger, M. Stampanoni
Multiscale and multimodal X-ray Tomographic Microscopy at TOMCAT
Interdisciplinary Symposium on 3D Microscopy, Interlaken, Switzerland, 12-16.07.2009

F. Marone, C. Hintermüller, R. Geus, B. Münch, P. Trtik, M. Stampanoni
Towards read-time tomography: Fast reconstruction algorithms
Interdisciplinary Symposium on 3D Microscopy, Interlaken, Switzerland, 12-16.07.2009

F. Marone, C. Hintermüller, S. McDonald, R. Abela, G. Mikuljan, A. Isenegger, M. Stampanoni
X-ray tomographic microscopy at TOMCAT
CIMST Mini-Symposium, Zurich, Switzerland, 13.01.2009

M. Matena, M. Enache, A. Llanes-Pallas, D. Bonifazi, T.A. Jung, M. Stöhr
Conformation-controlled networking of H-bonded assemblies on surfaces
Spring meeting of the DPG, Dresden, Germany, 03.2009

S.A. McDonald, F. Marone, C. Hintermüller, R. Mokso, C. David, M. Stampanoni
Advanced phase-contrast imaging using a grating interferometer
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.9-2.10.2010

S.A. McDonald, F. Marone, C. Hintermüller, M. Stampanoni
Differential Phase Contrast tomographic imaging using a grating interferometer
Interdisciplinary Symposium on 3D Microscopy, Interlaken, Switzerland, 12-16.7.2009

E.Mengotti, L.J. Heyderman, A. Fraile Rodríguez, A. Bisig, F.Nolting, L. Le Guyader, H.B. Braun
Frustration in dipolar coupled nanoscaled ferromagneticv elements
Joint User Meeting PSI (JUMP09), Paul Scherrer Institute, Villigen, Switzerland, 12-13.10.2009.

A. Menzel, M. Dierolf, C.M. Kewish, P. Thibault, K. Jefimovs, J. Vila-Comamala, C. David, M. Bech, T.H. Jensen, R. Feidenhans'l, A.-M. Heergaard, R. Hansen, T. Berthing, K.L. Martinez, J. Als-Nielsen, S. Kapishnikov, L. Leiserowitz, F. Pfeiffer, O. Bunk
Hard X-Ray Scanning Microscopy at the Swiss Light Source
Gordon Conference on X-Ray Physics, Waterville, Maine, USA, 02-07.08.2009

P. Modregger, S. McDonald, F. Marone, T. Thuering, M. Stampanoni
Differential phase contrast imaging with the grating interferometer at the TOMCAT beamline
First Joint Users' Meeting @ PSI, Villigen, Switzerland, 12-13.10.2009

R. Mokso, F. Marone, M. Stampanoni
Real time tomography at the TOMCAT beamline
First Joint Users' Meeting @ PSI, Villigen, Switzerland, 12-13.10.2009

R. Mokso, F. Marone, M. Stampanoni
New Developments in Real-Time X-Ray Tomography
Interdisciplinary Symposium on 3D Microscopy, Interlaken, Switzerland, 12-16.07.2009

R. Mokso, J. Villa-Comamala, F. Marone, G. Mikuljan, C. David, M. Stampanoni
Wave Optics Simulations and Experimental Results of Hard X-ray Nanoscope
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2010

R. Mokso, J. Villa-Comamala, C. David, M. Stampanoni,
A Wave Optics Study of the Hard X-Ray Microscope Based on Beamshaping Condenser Lens
Workshop on Simulation Methods for Xray Optical Systems, Grenoble, France, 02.2009

S. Neuhaus, C. Padeste, H.H. Solak, N.D. Spencer
Polymer nanocomposites by in situ creation of metal oxide particles in structured polymer brush matrices
European Polymer Congress EPF09, Graz, Austria, 12-17.07.2009

S. Neuhaus, C. Padeste and N.D. Spencer
Nanomechanical responsiveness of weak polyelectrolyte brushes probed with atomic force microscopy
Bayreuth Polymer Symposium, BPS'09, Bayreuth, Germany, 13-15.09.2009

C. Noiriel, M. Dubois, D. Bernard, R. Mokso, D. Guillaume,
Preliminary results on the volumetric property determination of inclusions by X-ray microtomography
ECROFI, Granada, Spain, 2009

K. Nygard, D.K. Satapathy, J. Buitenhuis, A. Diaz, E. Perret, O. Bunk, F. Pfeiffer, C. David, J.F. van der Veen
Local Structure of Liquids in Narrow Confinement
25th Annual Meeting of the Swiss Working Group on Surface and Interface Science, Fribourg, Switzerland, 23.01.2009

K. Nygard, D. K. Satapathy, J. Buitenhuis, A. Diaz, E. Perret, O. Bunk, F. Pfeiffer, C. David, J. F. van der Veen
Structure of Colloidal Liquids in Narrow Confinement
Structure and Dynamics of Soft Surfaces and Interfaces, Grenoble, France, 03-05.02.2009

K. Nygard, D. K. Satapathy, O. Bunk, E. Perret, J. Buitenhuis, C. David, J. F. van der Veen
Structure of Confined Fluids by Grating-Based Holographic X-Ray Diffraction
Annual Meeting of the Swiss Society of Crystallography, Fribourg, Switzerland, 08.09.2009

P. Oberta, P. Mikulik, J.Hrdy, M. Kittler
Highly asymmetric Laue focusing monochromator
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2010

V. Olieric, M. Wang, R. Bingel-Erlenmeyer, R. Schneider, C. Pradervand, W. Glettig, T. Tomizaki, E. Panepucci, V. Thominet, J. Gabadinho, E. Zimoch, A. Isenegger, C. Schulze-Briese
X06DA, a versatile protein crystallography beamline at the Swiss Light Source
25th European Crystallographic Meeting, Istanbul, Turkey, 16–21.08.2009

V. Olieric, M. Wang, R. Micura, C. Schulze-Briese, E. Ennifar, P. Dumas
New Tools for Nucleic Acid X-ray Structure Determination
European Symposium of the Protein Society, Zürich, Switzerland, 14-18.06.2009

E. Perret, K. Nygard, D. K. Satapathy, O. Bunk, T. Balmer, M. Heuberger, J.F. van der Veen
Proof of liquid layering in nanometer confinement
8th PSI Summer School, Zuoz, Switzerland, 02–10.08.2009

C. Piamonteze, F. Nolting, U. Flechsig, C. Quitmann, S. Rusponi, H. Brune
Xtreme: a new beamline at SLS for XMCD/XMLD at high magnetic field and low temperature
Joint Users Meeting @ PSI (JUM@P 2009), Villigen, Switzerland, 12-13.10.2009

M. Radović, Y.Sassa, M. Mansson, P. Willmott, X. Cui, S. Pailhes, M. Shi, F. Miletto Granozio, J. Mesot, L. Patthey
PLD deposition of YBCO thin films for in situ ARPES measurement: surface termination and reconstruction
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09, Zürich, Switzerland, 19-24.07.2009

M. Radović, Y.Sassa, M. Mansson, P. Willmott, X. Cui, S. Pailhes, M. Shi, F. Miletto Granozio, J. Mesot, L. Patthey
Fermi Surface Reconstruction of in-situ PLD grown thin films of underdoped $YBa_2Cu_3O_{7-\delta}$
2009 Swiss Workshop on Materials with Novel Electronic Properties, Les Diablerets, Switzerland, 26-28.08.2009

M. Radović, Y.Sassa, M. Mansson, P. Willmott, X. Cui, S. Pailhes, M. Shi, F. Miletto Granozio, J. Mesot, L. Patthey
Fermi Surface Reconstruction of in-situ PLD grown thin films of underdoped $YBa_2Cu_3O_{7-\delta}$
16th International Workshop on Oxide Electronics, Tarragona, Spain, 04-07.10 2009

M. Radović, Y.Sassa, M. Månsson, P. Willmott, X. Cui, S. Pailhes, M. Shi, F. Miletto Granozio, J. Mesot, L. Patthey
Reconstruction and Band Folding in the Underdoped Surface of $YBa_2Cu_3O_{7-\delta}$ *thin films made by Pulsed Laser Deposition*
First Joint Users' Meeting@PSI, Paul Scherrer Institut, Villigen, Switzerland, 12.-13.10.2009

E. Razzoli, M. Shi, A. Bendounan, S. Rosenkranz, M. R. Norman, J. C. Campuzano, J. Chang, M. Månsson, Y. Sassa, O. Tjernberg, L. Patthey, N. Momono, M. Oda, C. Mudry, J. Mesot
Spectroscopic evidence for preformed Cooper pairs in the pseudogap phase of cuprates
2009 Swiss Workshop on materials with Novel Electronic Properties, Les Diablerets, Switzerland, 26-28.08.2009

E. Razzoli, M. Shi, A. Bendounan, S. Rosenkranz, M. R. Norman, J. C. Campuzano, J. Chang, M. Månsson, Y. Sassa, O. Tjernberg, L. Patthey, N. Momono, M. Oda, C. Mudry, J. Mesot
Spectroscopic evidence for preformed Cooper pairs in the pseudogap phase of cuprates
JUM@P: Joint Users' Meeting at PSI 2009, Villigen PSI, Switzerland, 12.-13.10.2009

J. Rhensius, L. Heyne, D. Backes, S. Krzyk, D. Ilgaz, M. Kläui, L.J. Heyderman, U. Rüdiger, F. Nolting, A. Fraile-Rodriguez
Time resolved field induced domain wall excitations in permalloy wires
Frühjahrstagung der Deutschen Physikalischen Gesellschaft, Dresden, Germany, 22-27.03.2009

J. Rhensius, L. Heyne, D. Backes, S. Krzyk, L.J. Heyderman, F. Nolting, M. Kläui
Field Induced Domain Wall Exitation In Permalloy Nanowires
20th International Colloquium on Magnetic Films and Surfaces (ICMFS), Berlin, Germany, 20-24.07.2009

C. Rytka, H. Schift, H.H. Solak, C. Hofmann, J. Gobrecht
Nano injection molding : Processes and quality control
NNT2009, International Conference on Nanoimprint and Nanoprint Technology, San Jose, CA, USA, 11-13.11.2009

S.S. Sarkar, M. Saidani, H.H. Solak. C. David., J.F. van der Veen
High resolution Fresnel zone plate fabrication by achromatic spatial frequency multiplication with extreme ultraviolet light
35th International Conference on Micro and Nano Engineering (MNE 09), Gent, Belgium, 28.09-01.10.2009

Y.Sassa, M. Maansson, J. Chang, X. Cui, M. Shi, J. Kanter, L. Patthey, B. Batlogg, J. Mesot
Probing the Electronic Properties of $Na_{0.80-0.85}CoO_2$ by ARPES
MaNEP Workshop, Les Diablerets, Switzerland, 26-28.08.2009

Y.Sassa, M. Maansson, J. Chang, X. Cui, M. Shi, J. Kanter, L. Patthey, B. Batlogg, J. Mesot
Probing the Electronic Properties of $Na_{0.80-0.85}CoO_2$ by ARPES
JUM@P, PSI,Villigen, Switzerland, 12-13.10.2009

H. Schift, C. Spreu, M. Saidani, M. Bednarzik, J. Gobrecht, A. Klukowska, F. Reuther, G. Gruetzner, H.H. Solak
Transparent hybrid polymer stamp copies with sub-50 nm resolution for thermal and UV-nanoimprint lithography
EIPBN2009, Int. Conf. on electron, ion and photon beam technology and nanofabrication, Marco Island, Florida, USA 26-29.05.2009

H. Schift, C. Spreu, A. Schleunitz, J. Gobrecht, A. Klukowska, F. Reuther, G. Grützner
Easy mask-mold fabrication for combined nanoimprint and photolithography
EIPBN2009, Int. Conf. on electron, ion and photon beam technology and nanofabrication, Marco Island, Florida, USA 26-29.05.2009

A. Schleunitz, C. Spreu, H. Schift, T. Mäkelä, T. Haatainen, J. Ahopelto, A. Klukowska
Replicated sol-gel stamps with metal backbone used for roll-to-roll manufacturing
MNE, Int. Conf. on Micro- and Nanoengineering, Ghent, Belgium, 28.09-01.10.2010

A. Schleunitz, C. Spreu, T. Haatainen, A. Klukowska, H. Schift
Fabrication of working stamps with mesa structures for step and repeat nanoimprint lithography
NNT2009, International Conference on Nanoimprint and Nanoprint Technology, San Jose, CA, USA, 11-13.11.2009

A. Schleunitz, T. Senn, P. Datta, J. Göttert, S. Giselbrecht, M. Reinhardt, B. Löchel
Nanoprägen in Polymerfolien als Fertigungsverfahren für fluidische Mikro-Nano-Systeme
Mikrosystemtechnik-Kongress 2009, Berlin, Germany, 12-14.10.2009

T. Schmitt, J. Schlappa, K. J. Zhou, V. N. Strocov, L. Patthey
Opportunities and Perspectives with Soft X-Ray RIXS at the ADRESS-Beamline of the Swiss Light Source
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy, CORPES09, Zürich, Switzerland, 19-24.07.2009

G. Schulz, M. Germann, F. Pfeiffer, T. Weitkamp, C. David, O. Bunk, H. Deyhle, S. Lang, B. Müller
Phase contrast tomography of human brain using grating interferometry
DPG Frühjahrstagung, Dresden, Germany, 22-27.03.2009

P. Urwyler, J. Gobrecht, H. Schift, O. Bunk, B. Müller, O. Haefeli, A. Stumpp, B. Manhart
Disposable Polymeric Microcantilevers
Nano-Europe Conference, Rapperswil, Switzerland, 25-26.11.2009

A. Selle, T. Thelemann, G. Marowsky, M. Ehrat, A. Lieb, M. Altana, J. Gobrecht
Fabrication and investigation of nanostructured waveguides for optical detection of biomolecules
Nano-Europe Conference, Rapperswil, Switzerland, 25-26.11.2009

S.Y. Smith, M.E. Collinson, D.A. Simpson, P.J. Rudall, F. Marone, M. Stampanoni
Ancient Cyperaceae: evidence for widespread tropical forest sedges from the Eocene of Europe
Botany & Micology (Botanical Society of America), Snowbird, Utah, USA, 25-29.7.2009

M. Stampanoni, R. Mokso, F. Marone, J. Vila-Comamala, S. Gorelik, K. Jefimovs, C. David
Hard X-ray 3D phase-contrast imaging at TOMCAT
First Joint Users' Meeting @ PSI, Villigen, Switzerland, 12-13.10.2009

M. Stampanoni, F. Marone, R. Mokso, J. Vila-Comamala, G. Mikuljan, C. David
The TOMCAT hard X-ray nanoscope
10th International Conference on Synchrotron Radiation Instrumentation, Melbourne, Australia, 27.09-02.10.2010

M. Stampanoni, F. Marone, R. Mokso, G. Mikuljan, J. Vila-Comamala, C. David
The TOMCAT hard X-rays nanoscope
Interdisciplinary Symposium on 3D Microscopy, Interlaken, Switzerland, 12-16.07.2009

W. R. Stevens, A. Bodi, N. S. Shuman, C. Pongor, T. Baer
iPEPICO analysis of group IVB tetrachlorides
Gaseous Ions: Structures, Energetics & Reactions Gordon Conference, Galveston TX, USA, 01–06.03.2009

V.N. Strocov, T. Schmitt, C. Hess, U. Flechsig, L. Patthey, J. Mesot
Soft-X-ray ARPES endstation at the ADRESS beamline of Swiss Light Source
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09, Zürich, Switzerland, 19-24.07.2009

V.N. Strocov, T. Schmitt, C. Hess, U. Flechsig, L. Patthey, J. Mesot
Soft-X-ray ARPES endstation at the ADRESS beamline of SLS
First Joint Users' Meeting @ PSI, Villigen-PSI, Switzerland, 12-13.10.2009

V.N. Strocov
Concept of a one-shot RIXS spectrometer with parallel detection in incoming and outgoing photon energies
First Joint Users' Meeting @ PSI, Villigen-PSI, Switzerland, 12-13.10.2009

T. Thuering, P. Modregger, S. Rutishauser, C. David, M. Stampanoni,
Compact DPC microtomography device using a conventional X-ray tube
1st Joint Users Meeting at PSI, Villigen, Switzerland, 12-13.10.2009

T. Thuering, P. Modregger, S. A. McDonald, S. Rutishauser, C. David, M. Stampanoni
Differential phase contrast microtomography using a conventional X-ray tube
EMPA PhD's symposium, Duebendorf, Switzerland, 19.11.2009

P. Trtik, N. Juchler, F. Marone, S. McDonald, M. Stampanoni
Synchrotron microtomography investigation of the influence of X-ray radiation on microstructure of hardened cement pastes
3rd International Symposium on Nanotechnology in Construction, NICOM3, Prague, Czech Republic, 31.05-02.06.2009

S. Tsujino, E. Kirk, T. Vogel, J. Gobrecht
Field-emission chracteristics of single- and double-gate all-metallic field emitter arrays fabricated by molding and self-aligned gate process
22nd International Vacuum Nanoelectronics Conference, Hamamatsu, Japan, 20-24.07.2009

P. Urwyler, J. Gobrecht, H. Schift, O. Bunk, B. Müller, O. Haefeli, A. Stumpp, B. Manhart
Disposable Polymeric Microcantilevers
Nano-Europe Conference, Rapperswil, Switzerland, 25-26.11.2009

J. Vila-Comamala, K. Jefimovs, T. Pilvi, M. Dierolf, C. Kewish, P. Thibault, V. Guzenko, R. Mokso, F. Marone, J. Raabe, M. Stampanoni, M. Ritala, C. David
Advanced diffractive optics for X-ray microscopy
2nd School and Workshop on X-ray micro and nanoprobes, Palinuro, Italy, 14.-22.06.2009

J. Vila-Comamala, K. Jefimovs, T. Pilvi, M. Dierolf, C Kewish, P. Thibault, V. Guzenko, R. Mokso, F. Marone, J. Raabe, M. Stampanoni, C. David
Advanced Diffractive Optics for X-Ray Microscopy
School and Workshop on X-Ray Micro and Nanoprobes, Italy, 06.2009

J. Vila-Comamala, K. Jefimovs, T. Pilvi, S. Gorelick, V.A. Guzenko, M. Ritala, C. David
Nanofabrication of X-Ray Diffractive Optics
8^{th} PSI Summer School, Zuoz, Switzerland, 01-07.08.2009

J. Vila-Comamala, S. Gorelick, V.A. Guzenko, K. Jefimovs, E. Färm, T. Pilvi, M. Ritala, C. David
Nanofabrication of X-Ray Diffractive Optics
JUM@P, PSI-Villigen, Switzerland, 12-13.11.2009

M. Vogler, H. Atasoy, C. Spreu, H. Schift, M. Zelsmann, F. Schlachter, F. Reuther, G. Gruetzner
Resists with improved release properties for thermal and UV-based NIL
NNT2009, International Conference on Nanoimprint and Nanoprint Technology, San Jose, CA, USA, 11-13.11.2009.

E. Vorobeva, S. L. Johnson, P. Beaud, C. J. Milne, M. Benfatto, G. Ingold
Local structural changes in excited Ti^{3+}:Al_2O_3 studied by time-resolved XANES
14^{th} International Conference on X-Ray Absorption Fine Structure, Camerino, Italy, 26-31.7.2009

E. Vorobeva, P. Beaud, S. L. Johnson, U. Staub, R.A. DeSouza, C. J. Milne, Q. X. Jia, G. Ingold
An ultrafast structural phase transition driven by photo-induced melting of charge and orbital order
7^{th} Workshop on Orbital physics and Novel Phenomena in Transition Metal Oxides, Helmholz-Zentrum Berlin für Materialien und Energie, Adlershof, Germany, 07-08.10.2009

I. Zanette, T. Weitkamp, C. David, E. Reznikova, J. Mohr, V. Altapova, F. Pfeiffer
State of The Art of X-ray Talbot Interferometer Imaging at The ESRF
20th International Congress on X-ray Optics and Microanalysis, Karlsruhe, Germany, 14-18.09.2009

I. Zanette, T. Weitkamp, C. David, E. Reznikova, J. Mohr, V. Altapova and F. Pfeiffer
State of The Art of X-ray Talbot Interferometer Imaging at The ESRF
Coherence 2009 Workshop, Melbourne, Australia 02-04.10.2009

I. Zanette, T. Weitkamp, C. David, E. Reznikova, J. Mohr, V. Altapova and F. Pfeiffer
State of The Art of X-ray Talbot Interferometer Imaging at The ESRF
ESRF Science Days 2009, Val Cenis, France, 07-09.10.2009

V. Zelenay, T. Huthwelker, A. Křepelová, M. Birrer and M. Ammann
Observations of Water Uptake in Ammonium Sulfate Particles using X-ray Microspectrosopy
INTROP Conference, Portoroz- Slovenia, 14-17.04.2009

V. Zelenay, A. Křepelová, M. Birrer, T. Tritscher, R. Chirico, T. Huthwelker and M. Ammann
Soot- Water Uptake
NEADS Workshop, PSI Villigen, Switzerland, 07.07.2009

V. Zelenay, A. Křepelová, T. Huthwelker, M. Ammann,
Fulvic Acids: Tracking morphological Changes upon Water Uptake
JUM@P'09 Joint Users' Meeting at PSI, Villigen, Switzerland, 12-13.10.2009

WORKSHOPS AND CONFERENCES

L. Patthey
Organisation of International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09
Zürich, Switzerland, 19-24.07.2009

E. Razzoli
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09
Zürich, Switzerland, 19-24.07.2009,

Y. Sassa
3rd MaNEP Winter School, Exploring New Phases of Electronic Matter
Saas-Fee, Switzerland, 11-16.01.2009

J. Schlappa
3rd MaNEP Winter School, Exploring New Phases of Electronic Matter
Saas Fee, Switzerland, 11-16.01.2009

J. Schlappa
International workshop on the Spectroscopy and Coherent Scattering Endsation and associated instrumentation at the European XFEL
Paul Scherrer Institut, Villiegen PSI, Switzerland, 02-04.06.2009

J. Schlappa
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09
Zürich, Switzerland, 19-24.07.2009

M. Stampanoni
Interdisciplinary Symposium on 3D microscopy
Interlaken, SwitzerlandChair, Member of the Scientific Program

V.N. Strocov
International workshop on the Spectroscopy and Coherent Scattering Endstation and associated instrumentation at the European XFEL,
Paul Scherrer Institut, Villigen PSI, Switzerland*,* 02-04.06.2009

K.J. Zhou
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09
Zürich, Switzerland, 19-24.07.2009

K.J. Zhou
3rd MaNEP Winter School Exploring New Phases of Electronic Matter
Saas Fee, Switzerland, 11-16.01.2009

K.J. Zhou
International workshop on the Spectroscopy and Coherent Scattering Endstation and associated instrumentation at the European XFEL
Paul Scherrer Institut, Villigen PSI, Switzerland, 02-04.06.2009

PUBLIC RELATIONS

P. Beaud
- Ultrakurze Röntgenimpulse am PSI: vom FEMTO-Projekt zum SwissFEL,
  Oral Presentation at Power Lasers, CleanTech Day of the Swisslaser Net, ETH Zuerich, Switzerland, 27.07.2009

J. Gobrecht
- Science Fiction wird Realität – dank Nanotechnologie?, TecDay@Kanti Aarau, Kantonsschule, Aarau, Switzerland, 03.04.2009
- Science Fiction wird Realität – dank Nanotechnologie?, TecDay@ksso, Kantonsschule, Solothurn, Switzerland, 10.11.2009
- Presented booth at trade fair, Salon International Environment Professionel Micro-Technologies EPMT, Lausanne, Switzerland, 14-15.05.2009
- Presented booth at trade fair, Fachmesse Kunststoffmaschinen, Friedrichshafen, Germany, 13-17.10.2009
- Presented booth at trade fair, Nano Europe, Rapperswil, Switzerland, 25-26.11.2009

F. Nolting
- Licht am PSI sorgt bei Nanomagneten für Durchblick. Untersuchungen zu neuartigen magnetischen Materialien mit Synchrotronlicht, Jahresmedienkonferenz des Paul Scherrer Instituts PSI, Villigen, Switzerland, 23.06.2009

T.A. Jung
- Moleküle unter der Fuchtel des Rastertunnelmikroskops, B. Peiseler Sutter, in Chemische Rundschau Nr. 1-2, 09.02.2009
- Verfahren ermöglicht Steuerung von elektronischen Materialeigenschaften, Associated Press deutsche Ausgabe, 16.07.2009

- Durchbruch an der Uni. Elektronische Materialeigenschaften koönnen gesteuert und gezielt verändert werden, Esther Jundt, Basellandschaftliche Zeitung, Aargauer Zeitung, 16.07.2009
- Neue Materialien, Schweizer Forscher verändern Leitfähigkeit von Kupferoberflächen, Schweizerische Depeschen Agentur (SDA-ATS--Wissenschaft), 16.07.2009
- Neues Verfahren entwickelt, Steuerung von elektronischen Materialeigenschaften, Die Botschaft, Doettingen, 18.07.2009
- Material auf Knopfdruck verwandeln. Oberbaselbieter Zeitung Waldenburg, 23.07.2009
- Metamaterials Electrified, Michael Segal in Nature Nanotechnology 4, 24.07.2009
- Kandidaten fuer neue Metamaterialien Steuerung elektronischer Materialeigenschaften Chemie mit Labor flash, Solothurn, 09.10.2009

M. Stampanoni
- Das Unsichtbare sichtbar machen: die Röntgenmikrotomographie mit Synchrotronstrahlung ETH-Kolloquium, Zürich, Schweiz, 16.05.2009

DISSERTATIONS

C. David

- *Templated self-assembly of SiGe Quantum Dots*
  C. Dais, RWTH Aachen, Germany, (2009)

C. David

- *Neutron Grating Interferometry for Imaging Magnetic Structures in Bulk Ferromagnetic Materials*
  C. Grünzweig, ETH Zurich, Switzerland, (2009)

M. Janousch, U. Staub, F. van der Veen

- *Oxygen Vacancies in $SrTiO_3$: An X-Ray Absorption Study*
  B. P. Andreasson, ETH Zürich, Switzerland, (2009)

T.A. Jung

- *Organic semiconductor interfaces with insulators and metals*
  K. Müller, University Zurich, Switzerland, (2009)

T.A. Jung

- *Observing cooperative behavior with molecular surface structures*
  M. Matena, University of Basel, Switzerland, (2009)

B. Schmitt

- *Design of low phase noise low power CMOS phase locked loops*
  X. Shi, University of Neuchatel, Switzerland, (2009)

B. Schmitt

- *PILATUS 2M A detector for small angle x-ray scattering*
  P. Kraft, ETH Zürich, Switzerland, (2009)

U. Staub, F. van der Veen

- *Ordering Phenomena and Electronic Transitions in Co and Mn Based A-Site Ordered Perovskites*
  M. García-Fernández, ETH Zürich, Switzerland, (2009)

P. Willmott

- *Systematic structure investigation of YBCO thin films with direct methods and surface x-ray diffraction*
  C. Schlepütz, University of Zürich, 2009

P. Willmott

- *Structural studies of h-BN and graphene single-layers on transition-metal surfaces*
  D. Martoccia, University of Zürich, 2009

AWARDS

Y. Ekinci, *SSOM Fisba-Optik Prize*, 2009

G. Glettig, *PRIGO: Parallel Robotics Inspired Goniometer for Protein Crystallography,* Best Poster Award, 9th euspen International Conference, San Sebastian, Spain, 02-05.06.2009

S. Gorelick, *First prize in Micro- and Nanograph Contest*, 35th International Conference on Micro and Nano Engineering (MNE 09), Gent, Belgium

A.N. Kaufmann, H. Schift, E. Meyer, T.A. Jung, *The Fracture Behavior of Nanostructures*, this oral presentation was highlighted on the conference webpage with an article about the presentation/project, 2009 MRS Fall Meeting, Boston, USA, 30.11-04.12.2009

K. Mader, *Image Contest 1st and 3rd Place,* Institute for Biomechanics, ETH Zürich, November 2009

MEMBERSHIPS IN EXTERNAL COMMITTEES

C. David

- Member of the International Program Committee of the Micro- and Nano-Engineering Conference Series
- Member of the International Consortium for Coherent X-ray Diffractive Imaging (ICCDXI)
- Member of the Scientific Advisory Board of the Courant Research Centre "Nano-Spectroscopy and X-ray Imaging", University of Göttingen, Germany
- Member of the Editorial Board of the Journal of X-ray Optics and Instrumentation
- Member of the International Program Committee of the X-Ray Microscopy Conference Series
- Member of the International Advisory Committee of the Photon Conference Series
- Member of the Programm Committee of the 20th International Congress on X-Ray Optics and Microanalysis ICXOM20

J. Gobrecht

- Head of the Institute of Polymer Nanotechnology, University of Applied Sciences Nordwestschweiz, Brugg/Windisch, Switzerland
- Vice Director Technology of the Swiss Nanoscience Institute at the University of Basel
- Member of the board of the Swiss Micro- and Nanotechnology Network
- Member of the Scientific Advisory Board, HeiQ Materials AG, Bad Zurzach, Switzerland
- Member of the advisory board of the Nano-Europe Conference, Rapperswil, Switzerland, 2008
- Member of the board of directors, Eulitha AG, 5232 Villigen PSI
- Member of the jury for the “Förderpreis für Jungunternehmen” of the “W. A. de Vigier Foundation”, Solothurn, Switzerland
- Swedish Science Counsel, reviewer for strategic grant application “Nanoscience and Nanotechnology”, Stockholm, 05.2009
- External thesis reviewer, H.H. Cheng, Univ. of Canterbury, Christchurch, New Zeeland, 2009
- Member of the management team of i-net Basel Nano, and leader of innovation circle “Nanofabrication” within i-net Basel Nano
- Member of the proposal review committee, Karlsruhe Nano- and Micro-Facility in the Karlsruhe Institute of Technology

L.Heyderman

- Member of the Advisory Committee of the IEEE Magnetics Society
- MNE2009, International Program Committee
- 20th International Colloquium on Magnetic Films and Surfaces (ICMFS) Student Award Committee

S.L. Johnson

- Member of the International Programme Committee, European XFEL Femtosecond X-Ray Experiments Workshop, Budapest, Hugary, 9-11.12.2009

T.A.Jung

- Priority Program of the 'Deutsche Forschungs Gemeinschaft' SPP 1243 "Quantum transport at the molecular scale": Review Panel Member
- Scientific Committee for New and Emerging Health Risks (SCENIHR) of the Health and Consumers Directorate General of the European Commission
- Scientific Advisory Board for the European Physical Journal
- Editorial Advisory Board of the Europhysics News
- Steering Committee, Annales Henry Poincare

F. Nolting

- Member of the Proposal Review Committee of Soleil, France
- Member of DEIMOS beamline review committee, Soleil, France

L. Patthey

- Chairman of the Local Organisation Committee, International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09, Zürich, Switzerland, 19-24.07.2009
- Member of the International Program Committee, International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy CORPES09, Zürich, Switzerland, 19-24.07.2009
- Member of the International Program Committee, CORPES11, Berkley, USA
- Member of UWG for beamline I05-ARPES at Diamond Light Source, UK

C. Quitmann

- Member of the International Program Committee of the X-Ray Microscopy Conference Series
- Member recruitment committee for soft µscopy Beamline Scientist, SOLEIL, St. Aubin, France
- Science Advisory Committee of Diamond Light Source Ltd., Didcot, UK.
- Science Advisory Committee of ALBA Synchrotron Light Facility, Barcelona, Spain.
- Member of the program committee for XRMS10 - 10th International Workshop on X-Ray Spectroscopy of Magnetic Solids.
- Programme Committee of PSI Summer School on Condensed Matter Research, Zuoz, Switzerland.

T. Schmitt

- Member of the Organization Committee, Workshop on Soft X-ray Scattering - satellite meeting of ICESS-11, National Synchrotron Radiation Research Center, HsinChu, Taiwan, 12-13.10.2009

C. Schulze-Briese

- PSI Research Commission (FoKo), Villigen, Switzerland
- ESRF Proposal Review Committee (Methods and Instrumentation), Grenoble, France

- PETRA3 P11 beamline review, Hamburg, Germany
- EMBL@PETRA3 Scientific Advisory Board, Hamburg, Germany
- ESRF Beamline Review and Upgrade Committee (ID30), Grenoble, France
- Recruitment committee for PROXIMA 2 Beamline Scientist, SOLEIL, St. Aubin, France
- SRI2009 International Program Committee, Melbourne, Australia

H. Sigg

Member of the Intern. Advisory Committee of the International Conference on the Physics of Quantum Wells, ITQW2009

M. Stampanoni

- Member of ESRF-PRC-MD Panel, the European Synchrotron Radiation Facility Program Review Committee, Medical Applications Panel

U. Staub

- Executive committee member of the Swiss Physical Society (representative for condensed matter physics)
- Member of the Proposal Review Panel of FLASH

J.F. van der Veen

- Science Advisory Committee of Elettra, Trieste.
- Scientific Committee for Inorganic and Analytical Chemistry, Science Foundation, Flanders, Belgium.
- Chairman of Programme Committee of PSI Summer School on Condensed Matter Research, Zuoz, Switzerland.
- Scientific Advisory Committee of HERCULES, Grenoble.
- Chairman of Science Advisory Committee of the Advanced Light Source, Berkeley, USA
- International Advisory Committee of the International Conference Series on Synchrotron Radiation Instrumentation.
- Science Advisory Committee of Synchrotron SOLEIL, Gif-sur-Yvette, France
- Science Advisory Committee of APS, Argonne, USA
- Science Advisory Committee of ANKA, Karlsruhe, Germany
- Advisory Committee of the International Conference Series on Surface X-Ray and Neutron Scattering.
- Steering Committee CCMX, Competence Centre for Materials Science and Technology, ETH, Switzerland.
- Steering Committee NCCBI, National Competence Center in Biomedical Imagine, ETH, Switzerland.
- Science Advisory Committee for the Van der Waals-Zeeman Instituut, University of Amsterdam, The Netherlands.
- Member of Committee advising the Bundesministerium für Bildung und Forschung (BMBF) on research with photons in Germany
- Science Advisory Committee of National Synchrotron Radiation Research Center, Hsinchu, Taiwan.
- Committee advising on investments in chemical sciences, NWO, The Netherlands
- Advisory committee of the Swiss Nanoscience institute

PATENTS

B. Schmitt, A. Bergamaschi, A. Mozzanica
X-ray detector with integrating readout chip for single photon resolution
European patent application 2009P09800EP

S. Tsujino, E. Kirk
Method to produce a field-emitter array with controlled apex sharpness
Patent # WO/2009/156242

LIST OF PUBLICATIONS 2009 (PEER REVIEWED)

Condensed Matter Research with Neutrons and Muons

NUM, CMT, User-office

Andreasson BP, Janousch M, Staub U, Todorova T, Delley B, Meijer GI, Pomjakushina E
Detecting oxygen vacancies in SrTiO3 by 3d transition-metal tracer ions
Physical Review B **80**, 212103 (2009)

Belonoshko AB, Derlet PM, Mikhaylushkin AS, Simak SI, Hellman O, Burakovsky L, Swift DC, Johansson B
Quenching of bcc-Fe from high to room temperature at high-pressure conditions: a molecular dynamics simulation
New Journal of Physics **11**, 093039 (2009)

Bitzek E, Brandl C, Weygand D, Derlet PM, Van Swygenhoven H
Atomistic simulation of a dislocation shear loop interacting with grain boundaries in nanocrystalline aluminium
Modelling and Simulation In Materials Science And Engineering **17**, 055008 (2009)

Brandl C, Derlet PM, Van Swygenhoven H
Strain rates in molecular dynamics simulations of nanocrystalline metals
Philosophical Magazine **89**, 3465 (2009)

Carter DJ, Puckeridge M, Delley B, Stampfl C
Quantum confinement effects in gallium nitride nanostructures: ab initio investigations
Nanotechnology **20**, 425401 (2009)

Chiesa S, Derlet PM, Dudarev SL
Free energy of a << 110 >> dumbbell interstitial defect in bcc Fe: Harmonic and anharmonic contributions
Physical Review B **79**, 214109 (2009)

Chiesa S, Derlet PM, Dudarev SL, Van Swygenhoven H
Atomistic calculation of elastic constants of alpha-iron containing point defects by means of magnetic interatomic potentials
Journal of Nuclear Materials **386**, 49 (2009)

Chiesa S, Gilbert MR, Dudarev SL, Derlet PM, Van Swygenhoven H
The non-degenerate core structure of a 1/2 < 111 > screw dislocation in bcc transition metals modelled using Finnis-Sinclair potentials: The necessary and sufficient conditions
Philosophical Magazine **89**, 3235 (2009)

Cormary B, Malfant I, Valade L, Cointe MBL, Toupet L, Todorova T, Delley B, Schaniel D, Mockus N, Woike T, Fejfarova K, Petricek V, Dusek M
[Ru(py)(4)Cl(NO)](PF6)(2)center dot 0.5H(2)O: a model system for structural determination and ab initio calculations of photo-induced linkage NO isomers (vol 65, pg 612, 2009)
Acta Crystallographica Section B-Structural Science **65**, 787 (2009)

Cui XY, Delley B, Freeman AJ, Stampfl C
First-principles investigation of Mn delta-layer doped GaN/AlN/GaN (0001) tunneling junctions
Journal of Applied Physics **106**, 043711 (2009)

Derlet PM, Gumbsch P, Hoagland R, Li J, McDowell DL, Van Swygenhoven H, Wang J
Atomistic Simulations of Dislocations in Confined Volumes
Mrs Bulletin **34**, 184 (2009)

Derlet PM, Van Petegem S, Van Swygenhoven H
Vibrational properties of grain boundaries in nanocrystalline Ni using second moment potentials
Philosophical Magazine **89**, 3511 (2009)

Dudarev SL, Boutard JL, Lasser R, Caturla MJ, Derlet PM, Fivel M, Fu CC, Lavrentiev MY, Malerba L, Mrovec M, Nguyen-Manh D, Nordlund K, Perlado M, Schaublin R, Van Swygenhoven H, Terentyev D, Wallenius J, Weygand D, Willaime F
The EU programme for modelling radiation effects in fusion reactor materials: An overview of recent advances and future goals
Journal of Nuclear Materials **386**, 1 (2009)

Dudarev SL, Derlet PM, Bullough R
The magnetic origin of anomalous high-temperature stability of dislocation loops in iron and iron-based alloys
Journal of Nuclear Materials **386**, 45 (2009)

Elsener A, Politano O, Derlet PM, Van Swygenhoven H
Variable-charge method applied to study coupled grain boundary migration in the presence of oxygen
Acta Materialia **57**, 1988 (2009)

Fronzi M, Piccinin S, Delley B, Traversa E, Stampfl C
Water adsorption on the stoichiometric and reduced CeO2(111) surface: a first-principles investigation
Physical Chemistry Chemical Physics **11**, 9188 (2009)

Fronzi M, Soon A, Delley B, Traversa E, Stampfl C
Stability and morphology of cerium oxide surfaces in an oxidizing environment: A first-principles investigation
Journal of Chemical Physics **131**, 104701 (2009)

Li L, Anderson PM, Lee MG, Bitzek E, Derlet P, Van Swygenhoven H
The stress-strain response of nanocrystalline metals: A quantized crystal plasticity approach
Acta Materialia **57**, 812 (2009)

Medarde M, Dallera C, Grioni M, Delley B, Vernay F, Mesot J, Sikora M, Alonso JA, Martinez-Lope MJ
Charge disproportionation in RNiO3 perovskites (R=rare earth) from high-resolution x-ray absorption spectroscopy
Physical Review B **80**, 245105 (2009)

Meier F, Petrov V, Guerrero S, Mudry C, Patthey L, Osterwalder J, Dil JH
Unconventional Fermi surface spin textures in the BixPb1-x/Ag(111) surface alloy
Physical Review B **79**, 241408 (2009)

Posternak M, Baldereschi A, Delley B
Dissociation of Water on Anatase TiO2 Nanoparticles: the Role of Undercoordinated Ti Atoms at Edges
Journal of Physical Chemistry C **113**, 15862 (2009)

Rotaru GM, Roessli B, Amato A, Gvasaliya SN, Mudry C, Lushnikov SG, Shaplygina TA
Spin-glass state and long-range magnetic order in Pb(Fe1/2Nb1/2)O-3 seen via neutron scattering and muon spin rotation
Physical Review B **79**, 184430 (2009)

Ryu S, Mudry C, Hou CY, Chamon C
Masses in graphenelike two-dimensional electronic systems: Topological defects in order parameters and their fractional exchange statistics
Physical Review B **80**, 205319 (2009)

Schaniel D, Woike T, Behrnd NR, Hauser J, Kramer KW, Todorova T, Delley B
Photogeneration of Nitrosyl Linkage Isomers in Octahedrally Coordinated Platinum Complexes in the Red Spectral Range
Inorganic Chemistry **48**, 11399 (2009)

Schlappa J, Schmitt T, Vernay F, Strocov VN, Ilakovac V, Thielemann B, Ronnow HM, Vanishri S, Piazzalunga A, Wang X, Braicovich L, Ghiringhelli G, Marin C, Mesot J, Delley B, Patthey L
Collective Magnetic Excitations in the Spin Ladder Sr14Cu24O41 Measured Using High-Resolution Resonant Inelastic X-Ray Scattering
Physical Review Letters **103**, 047401 (2009)

Schnyder AP, Mudry C, Gruzberg IA
The superspin approach to a disordered quantum wire in the chiral-unitary symmetry class with an arbitrary number of channels
Nuclear Physics B **822**, 424 (2009)

Shi M, Bendounan A, Razzoli E, Rosenkranz S, Norman MR, Campuzano JC, Chang J, Mansson M, Sassa Y, Claesson T, Tjernberg O, Patthey L, Momono N, Oda M, Ido M, Guerrero S, Mudry C, Mesot J
Spectroscopic evidence for preformed Cooper pairs in the pseudogap phase of cuprates
EPL **88**, 27008 (2009)

Soon A, Cui XY, Delley B, Wei SH, Stampfl C
Native defect-induced multifarious magnetism in nonstoichiometric cuprous oxide: First-principles study of bulk and surface properties of Cu2-delta O
Physical Review B **79**, 035205 (2009)

Todorova T, Krocher O, Delley B
DFT study of structural and vibrational properties of guanidinium derivatives
Journal of Molecular Structure-Theochem **907**, 16 (2009)

Yang WL, Sorini AP, Chen CC, Moritz B, Lee WS, Vernay F, Olalde-Velasco P, Denlinger JD, Delley B, Chu JH, Analytis JG, Fisher IR, Ren ZA, Yang J, Lu W, Zhao ZX, van den Brink J, Hussain Z, Shen ZX, Devereaux TP
Evidence for weak electronic correlations in iron pnictides
Physical Review B **80**, 014508 (2009)

CONFERENCE, WORKSHOP AND SEMINAR CONTRIBUTIONS

P. M. Derlet, N. Gao, M. Samaras, S. Chiesa, H. Van Swygenhoven, S. Dudarev, M. Gilbert,
Developing a semi-empirical potential for He in ferromagentic BCC FE
Invited talk in Fe-He Meeting, June 15, 2009, PSI, Switzerland

P. M. Derlet, R. Maaß, J. F. Löffler,
The vibrational properties of model bulk metallic glasses
Poster in Mechanical Behavior at Small Scales - Experiments and Modeling, MRS Fall Meeting 2009, Boston USA

Chr. Mudry
APS March meeting Pittsburg
Quantum Hall effect of massless Dirac fermions in a vanishing magnetic field
Kentaro Nomura, Shinsei Ryu, Mikito Koshino, Christopher Mudry, and Akira Furusaki
BAPS: B25.00001

Chr. Mudry
Quantum number fractionalization in condensed matter physics
SLS symposium on graphene, September 2009

B. Delley and M. Posternak
Reaction path for dissociative water adsorption on nanostructured anatase (101) surface
APS March Meeting, Mar 18 2009 Pittsburgh USA

Francois Vernay,
Swiss Workshop on Materials with Novel Electronic Properties
August 2009, Les Diablerets, Switzerland
Francois Vernay,
Poster presentation @ CORPES09, July 2009 Zurich

S. Guerrero
Ecole De Physique, Les Houches,
School an Modern theories of correlated electron systems, May 10-29, 2009

S. Guerrero
ICTP, Trieste, Summer College on Nonequilibrium Physics from Classical to Quantum Low Dimensional Systems, July 6-24, 2009

S. Guerrero
MaNEP, Les Diablerets, Swiss Workshop on Materials With Novel Electronic Properties, August 26-28, 2009

PROCEEDINGS

B. Delley and M. Posternak
Reaction path for dissociative water adsorption on nanostructured anatase (101) surface
APS March meeting Pittsburg
BAPS: Q12.00003

F. Vernay and B. Delley
Multiplets and Crystal Fields: Systematics for X-Ray Spectroscopies
APS March meeting Pittsburg BAPS: W10.00013

J. Schlappa, T. Schmitt, F. Vernay, V.N. Strocov, B. Thielemann, H.M. Ronnow, J. Mesot, B. Delley, L. Patthey, V. Ilakovac
Collective spin-excitations in Cu L and O K edge Resonant Inelastic X-ray Scattering on $Sr_{14}Cu_{24}O_{41}$
APS March meeting Pittsburg BAPS: B32.00005

X.-Y. Cui, A. Soon, B. Delley, S.-H. Wei, C. Stampfl
Multifarious-magnetism in copper oxide nanostructures from first-principles
APS March meeting Pittsburg BAPS: H32.00013

M. Lavagnini, M. Baldini, A. Sacchetti, D. Di Castro, B. Delley, R. Monnier, J.H. Chu, N. Ru, I.R. Fisher, P. Postorino, L. Degiorgi
Evidence for coupling between charge-density-wave and phonons in two-dimensional rare-earth tri-tellurides
APS March meeting Pittsburg BAPS: H41.00005

Katawut Chuasiripattana Oliver Warschkow, Bernard Delley, Cathy Stampfl,
First principles study of Cu on Zn(0001): Resolution of the $\left(\sqrt{3}\cdot\sqrt{3}\right)-R30^{\circ}$ *-- Cu/ZnO(0001) surface phase*
APS March meeting Pittsburg BAPS: K1.00199

Katawut Chuasiripattana, Oliver Warschkow, Bernard Delley, Cathy Stampfl
Atomic structures and energetics of methanol and its reaction intermediates on the ZnO(0001) surface : A first-principles study
APS March meeting Pittsburg BAPS: T12.00001

Steve Johnston, Francois Vernay, and T. P. Devereaux
The Impact of an Oxygen Dopant in an ideal $Bi_2Sr_2CaCu_2O_{8+\delta}$ Crystal
APS March meeting Pittsburg
BAPS: P34.00007

INVITED TALKS

P. Derlet
Developing semi-empirical atomistic models for ferromagentic BCC Fe
Seminar Talk, University of Poitiers, Poitiers, France, July 21st 2009

P. Derlet
Developing semi-empirical atomistic models for ferromagentic BCC Fe
Seminar Talk, Technical University of Darmstadt, Darmstadt, Germany, July 6th 2009

P. Derlet
Atomistic modelling of steels
Seminar Talk, Fraunhofer-Institut für Werkstoffmechanik, Freiburg, Germany, July 3rd 2009

Christopher Mudry,
Topological qubits in graphene-like systems
Universite Paris-Sud, Laboratoire de physiques des solides, December 2009.

Christopher Mudry,
Quantum number fractionalization in condensed matter physics
EPFL, September 2009

B. Delley
DFT studies from molecules to surfaces, solids and liquids with DMol3
Theory Meets Industry, Nov 12 2009, Nagoya Japan.

Francois Vernay
GDR Materiaux et Interactions en COmpetition (MICO)
Aspet, France october 2009

Francois Vernay
RIXS Workshop, ESRF, Grenoble, june 2009

Francois Vernay
Condensed matter group seminar, ETHZ, Z\urich, june 2009

Francois Vernay
Condensed matter group seminar, Stanford University, march 2009

LECTURES AND COURSES

Dr. Peter Derlet
- Lecture series on Atomistic modelling of metals: introduction and application at the Thematische Sommerschule vom Modell zum Experiment, 6-12 September, Uni Karlsruhe, Germany

Dr. Christopher Mudry
- Field Theory in Condensed Matter Physics, ETHZ

Dr. Bernard Delley
- Tutorial introduction into the theory of functinoal materials
  PSI Summer School, Aug 2 2009 Zuoz

MEMBERSHIP IN EXTERNAL COMMITTEES

Dr. K. Clausen
- Member of the Board of NMI3 (since 2004)
- Member of the International Advisory Committee for The RIKEN-RAL Muon Facility
- Member of the Japan Spallation Neutron Source International Advisory Committee (NIAC)

Dr. B. Delley
- Advisary Board Electronic Structure Theory, EMRS conference series
- Psi-K network local orbital topical group

Dr. P. Derlet
- MRS Fall 2009 lead symposium GG organiser for Plasticity in confined volumes: simulations and experiments, Boston, USA, 2009.
- Member of international advisory committee for EMMM09: Electron microscopy and multi-scale modelling, Zurich, Switzerland, 2009

AWARDS

Dr. B. Delley
- Fellow of the American Association for the Advancement of Science since 2009
- TDDFT knowledge transfer, industrial contract with Accelrys

Condensed Matter Research with Neutrons and Muons

Laboratory for Particle Physics (LTP)

LIST OF PUBLICATIONS (PEER REVIEWED)

Aaron FD, Abramowicz H, Abt I, Adamczyk L, Adamus M, Martin MA, Alexa C, Alimujiang K, Andreev V, Antonelli S, Antonioli P, Antonov A, Antunovic B, Arneodo M, Asmone A, Aushev V, Bachynska O, Backovic S, Baghdasaryan A, Bamberger A, Barakbaev AN, Barbagli G, Bari G, Barreiro F, Barrelet E, Bartel W, Bartsch D, Basile M, Begzsuren K, Behnke O, Behr J, Behrens U, Bellagamba L, Belousov A, Bertolin A, Bhadra S, Bindi M, Bizot JC, Blohm C, Bold T, Boos EG, Borodin M, Borras K, Boscherini D, Bot D, Boudry V, Boutle SK, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, et al.
Multi-leptons with high transverse momentum at HERA
Journal of High Energy Physics , 013 (2009)

Aaron FD, Alexa C, Alimujiang K, Andreev V, Antunovic B, Asmone A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Begzsuren K, Belousov A, Bizot JC, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, Dodonov V, Dossanov A, Dubak A, Eckerlin G, Efremenko V, Egli S, Eliseev A, et al.
A precision measurement of the inclusive ep scattering cross section at HERA
European Physical Journal C **64**, 561 (2009)

Aaron FD, Alexa C, Alimujiang K, Andreev V, Antunovic B, Asmone A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Begzsuren K, Belousov A, Bizot JC, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, Dodonov V, Dossanov A, Dubak A, Eckerlin G, Efremenko V, Egli S, Eliseev A, et al.
Search for excited quarks in ep collisions at HERA
Physics Letters B **678**, 335 (2009)

Aaron FD, Alexa C, Andreev V, Antunovic B, Aplin S, Asmone A, Astvatsatourov A, Bacchetta A, Backovic S, Baghdasaryan A, Baranov R, Barrelet E, Bartel W, Beckingham M, Begzsuren K, Behnk O, Belousov A, Berger N, Bizot JC, Boenig MO, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, et al.
Measurement of diffractive scattering of photons with large momentum transfer at HERA
Physics Letters B **672**, 219 (2009)

Aaron FD, Alexa C, Andreev V, Antunovic B, Aplin S, Asmone A, Astvatsatourov A, Bacchetta A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Beckingham M, Begzsuren K, Behnke O, Belousov A, Berger N, Bizot JC, Boenig MO, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KB, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, Dodonov V, et al.
Study of charm fragmentation into D (+/-) mesons in deep-inelastic scattering at HERA*
European Physical Journal C **59**, 589 (2009)

Aaron FD, Alexa C, Andreev V, Antunovic B, Aplin S, Asmone A, Astvatsatourov A, Bacchetta A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Beckingham M, Begzsuren K, Behnke O, Belousov A, Berger N, Bizot JC, Boenig MO, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, Dodonov V, et al.
Strangeness production at low Q(2) in deep-inelastic ep scattering at HERA
European Physical Journal C **61**, 185 (2009)

Aaron FD, Alexa C, Andreev V, Antunovic B, Aplin S, Asmone A, Astvatsatourov A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Begzsuren K, Behnke O, Behrendt O, Belousov A, Bizot JC, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KB, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, Dodonov V, Dossanov A, Dubak A, Eckerlin G, et al.
Measurement of the inclusive ep scattering cross section at low Q (2) and x at HERA
European Physical Journal C **63**, 625 (2009)

Aaron FD, Alexa C, Andreev V, Antunovic B, Aplin S, Asmone A, Astvatsatourov A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Begzsuren K, Behnke O, Belousov A, Berger N, Bizot JC, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, Dodonov V, Dossanov A, Dubak A, Eckerlin G, et al.
Inclusive photoproduction of rho(0), K(0) and phi mesons at HERA H1 Collaboration*
Physics Letters B **673**, 119 (2009)

Aaron FD, Alexa C, Andreev V, Antunovic B, Aplin S, Asmone A, Astvatsatourov A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Begzsuren K, Behnke O, Belousov A, Bizot JC, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, Dodonov V, Dossanov A, Dubak A, Eckerlin G, Efremenko V, et al.
A general search for new phenomena at HERA
Physics Letters B **674**, 257 (2009)

Aaron FD, Alexa C, Andreev V, Antunovic B, Aplin S, Asmone A, Astvatsatourov A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Begzsuren K, Behnke O, Belousov A, Bizot JC, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, Dodonov V, Dossanov A, Dubak A, Eckerlin G, Efremenko V, et al.
Events with isolated leptons and missing transverse momentum and measurement of W production at HERA
European Physical Journal C **64**, 251 (2009)

Aaron FD, Martin MA, Alexa C, Alimujiang K, Andreev V, Antunovic B, Asmone A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Begzsuren K, Belousov A, Bizot JC, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Roeck A, De Wolf EA, Diaconu C, Dodonov V, Dossanov A, Dubak A, Eckerlin G, Efremenko V, Egli S, et al.
Search for single top quark production at HERA
Physics Letters B **678**, 450 (2009)

Aaron FD, Martin MA, Alexa C, Alimujiang K, Andreev V, Antunovic B, Asmone A, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Begzsuren K, Belousov A, Bizot JC, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cassol-Brunner F, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Wolf EA, Diaconu C, Dodonov V, Dossanov A, Dubak A, Eckerlin G, Efremenko V, Egli S, Eliseev A, et al.
Observation of the hadronic final state charge asymmetry in high Q(2) deep-inelastic scattering at Hera
Physics Letters B **681**, 125 (2009)

Aaron FD, Martin MA, Alexa C, Alimujiang K, Andreev V, Antunovic B, Backovic S, Baghdasaryan A, Barrelet E, Bartel W, Begzsuren K, Belousov A, Bizot JC, Boudry V, Bozovic-Jelisavcic I, Bracinik J, Brandt G, Brinkmann M, Brisson V, Bruncko D, Bunyatyan A, Buschhorn G, Bystritskaya L, Campbell AJ, Avila KBC, Cerny K, Cerny V, Chekelian V, Cholewa A, Contreras JG, Coughlan JA, Cozzika G, Cvach J, Dainton JB, Daum K, Deak M, de Boer Y, Delcourt B, Del Degan M, Delvax J, De Wolf EA, Diaconu C, Dodonov V, Dossanov A, Dubak A, Eckerlin G, Efremenko V, Egli S, Eliseev A, Elsen E, Falkiewicz A, et al.
Deeply virtual Compton scattering and its beam charge asymmetry in e(+/-)p collisions at HERA
Physics Letters B **681**, 391 (2009)

Abdullin S, Abramov V, Acharya B, Adam N, Adams M, Adzic P, Akchurin N, Akgun U, Albayrak E, Alemany-Fernandez R, Almeida N, Anagnostou G, Andelin D, Anderson E, Anfreville M, Anicin I, Antchev G, Antunovic Z, Arcidiacono R, Arenton M, Auffray E, Argiro S, Askew A, Atramentov O, Ayan S, Arcidy M, Aydin S, Aziz T, Baarmand M, Babich K, Baccaro S, Baden D, Baffioni S, Bakirci M, Balazs M, Banerjee S, Banerjee S, Bard R, Barge D, Barnes V, Barney D, Barone L, Bartoloni A, Baty C, Bawa H, Baiatian G, Bandurin D, Beauceron S, Bell K, Bencze G, Benetta R, et al.
The CMS barrel calorimeter response to particle beams from 2 to 350 GeV/c (vol 60, pg 359, 2009)
European Physical Journal C **61**, 353 (2009)

Abdullin S, Abramov V, Acharya B, Adam N, Adams M, Adzic P, Akchurin N, Akgun U, Albayrak E, Alemany-Fernandez R, Almeida N, Anagnostou G, Andelin D, Anderson E, Anfreville M, Anicin I, Antchev G, Antunovic Z, Arcidiacono R, Arenton M, Auffray E, Argiro S, Askew A, Atramentov O, Ayan S, Arcidy M, Aydin S, Aziz T, Baarmand M, Babich K, Baccaro S, Baden D, Baffioni S, Bakirci MN, Balazs M, Banerjee S, Banerjee S, Bard R, Barge D, Barnes V, Barney D, Barone L, Bartoloni A, Baty C, Bawa H, Baiatian G, Bandurin D, Beauceron S, Bell KW, Bencze G, Benetta R, et al.
The CMS barrel calorimeter response to particle beams from 2 to 350 GeV/c
European Physical Journal C **60**, 359 (2009)

Actis S, Mastrolia P, Ossola G
Numerical Evaluation of One-Loop Scattering Amplitudes For Hard-Photon Emission In Bhabha Scattering
Acta Physica Polonica B **40**, 2957 (2009)

Adam W, Bergauer T, Dragicevic M, Friedl M, Fruhwirth R, Hansel S, Hrubec J, Krammer M, Oberegger M, Pernicka M, Schmid S, Stark R, Steininger H, Uhl D, Waltenberger W, Widl E, Van Mechelen P, Cardaci M, Beaumont W, de Langhe E, de Wolf EA, Delmeire E, Hashemi M, Bouhali O, Charaf O, Clerbaux B, Dewulf JP, Elgammal S, Hammad G, de Lentdecker G, Marage P, Velde CV, Vanlaer P, Wickens J, Adler V, Devroede O, De Weirdt S, D'Hondt J, Goorens R, Heyninck J, Maes J, Mozer M, Tavernier S, Van Lancker L, Van Mulders P, Villella I, Wastiels C, Bonnet JL, Bruno G, De Callatay B, Florins B, et al.
Performance studies of the CMS Strip Tracker before installation
Journal of Instrumentation **4**, P06009 (2009)

Allanach BC, Balazs C, Belanger G, Bernhardt M, Boudjema F, Choudhury D, Desch K, Ellwanger U, Gambino P, Godbole R, Goto T, Guasch J, Guchait M, Hahn T, Heinemeyer S, Hugonie C, Hurth T, Kraml S, Kreiss S, Lykken J, Moortgat F, Moretti S, Penaranda S, Plehn T, Porod W, Pukhov A, Richardson P, Schumacher M, Silvestrini L, Skands P, Slavich P, Spira M, Weiglein G, Wienemann P
SUSY Les Houches Accord 2
Computer Physics Communications **180**, 8 (2009)

Altarev I, Baker CA, Ban G, Bison G, Bodek K, Daum M, Fierlinger P, Geltenbort P, Green K, van der Grinten MGD, Gutsmiedl E, Harris PG, Heil W, Henneck R, Horras M, Iaydjiev P, Ivanov SN, Khomutov N, Kirch K, Kistryn S, Knecht A, Knowles P, Kozela A, Kuchler F, Kuzniak M, Lauer T, Lauss B, Lefort T, Mtchedlishvili A, Naviliat-Cuncic O, Pazgalev A, Pendlebury JM, Petzoldt G, Pierre E, Pignol G, Quemener G, Rebetez M, Rebreyend D, Roccia S, Rogel G, Severijns N, Shiers D, Sobolev Y, Weis A, Zejma J, Zsigmond G
Test of Lorentz Invariance with Spin Precession of Ultracold Neutrons
Physical Review Letters **103**, 081602 (2009)

Altarev I, Baker CA, Ban G, Bodek K, Daum M, Fierlinger P, Geltenbort P, Green K, van der Grinten MGD, Gutsmiedl E, Harris PG, Henneck R, Horras M, Iaydjiev P, Ivanov S, Khomutov N, Kirch K, Kistryn S, Knecht A, Knowles P, Kozela A, Kuchler F, Kuzniak M, Lauer T, Lauss B, Lefort T, Mtchedlishvili A, Naviliat-Cuncic O, Paul S, Pazgalev A, Pendlebury JM, Petzoldt G, Pierre E, Plonka-Spehr C, Quemener G, Rebreyend D, Roccia S, Rogel G, Severijns N, Shiers D, Sobolev Y, Stoepler R, Weis A, Zejma J, Zenner J, Zsigmond G
Neutron to mirror-neutron oscillations in the presence of mirror magnetic fields
Physical Review D **80**, 032003 (2009)

I. Altarev et al.
Towards a new measurement of the neutron electric dipole moment
Particle Physics with Slow Neutrons ILL, 2008
Nucl. Instr. Meth. A **611** (2009) 133

A. Anghel et al.
The PSI ultra-cold neutron source
Particle Physics with Slow Neutrons ILL, 2008
Nucl. Instr. Meth. A **611** (2009) 272

F. Atchison et al.
Investigation of solid D2, O2 and CD4 for ultracold neutron production
Particle Physics with Slow Neutrons ILL , 2008
Nucl. Instr. Meth. A **611** (2009) 252

Amsler C, Bosiger K, Chiochia V, Erdmann W, Gabathuler K, Horisberger R, Konig S, Kotlinski D, Maier R, Meier B, Meyer H, Rizzi A, Robmann P, Scherr S, Schmidt A, Steiner S, Streuli S
Mechanical design and material budget of the CMS barrel pixel detector
Journal of Instrumentation **4**, P05003 (2009)

Anderhub H, Backes M, Biland A, Boller A, Braun I, Bretz T, Commichau S, Commichau V, Dorner D, Gendotti A, Grimm O, von Gunten H, Hildebrand D, Horisberger U, Krahenbuhl T, Kranich D, Lorenz E, Lustermann W, Mannheim K, Neise D, Pauss F, Renker D, Rhode W, Rissi M, Roser U, Rollke S, Stark LS, Stucki JP, Viertel G, Vogler P, Weitzel Q
A novel camera type for very high energy gamma-ray astronomy based on Geiger-mode avalanche photodiodes
Journal of Instrumentation **4**, P10010 (2009)

Antognini A, Schuhmann K, Amaro FD, Biraben F, Dax A, Giesen A, Graf T, Hansch TW, Indelicato P, Julien L, Kao CY, Knowles PE, Kottmann F, Le Bigot E, Liu YW, Ludhova L, Moschuring N, Mulhauser F, Nebel T, Nez F, Rabinowitz P, Schwob C, Taqqu D, Pohl R
Thin-Disk Yb:YAG Oscillator-Amplifier Laser, ASE, and Effective Yb:YAG Lifetime
IEEE Journal of Quantum Electronics **45**, 983 (2009)

Atchison F, Blau B, Bollhalder A, Daum M, Fierlinger P, Geltenbort P, Hampel G, Kasprzak M, Kirch K, Kochli S, Kuczewski B, Leber H, Locher M, Meier M, Ochse S, Pichlmaier A, Plonka C, Reiser R, Ulrich J, Wang X, Wiehl N, Zimmer O, Zsigmond G
Transmission of very slow neutrons through material foils and its influence on the design of ultracold neutron sources
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **608**, 144 (2009)

G. Ban et al.
Search for exotic couplings in neutron decay: A measurement of the transverse polarization of electrons
PANIC08, 9-14 Nov 2008, Eilat, Israel
Nucl.Phys.A **827**:422C-424C, 2009

G. Ban et al.
Measurement of the transverse polarization of electrons emitted in neutron decay: A search for weak exotic couplings
Particle Physics with Slow Neutrons ILL, 2008
Nucl. Instr. Meth. A **611** (2009) 198

Ban G, Bialek A, Bodek K, Bozek J, Gorel P, Kirch K, Kistryn S, Kozela A, Kuzniak M, Naviliat-Cuncic O, Severijns N, Stephan E, Zejma J
Search for Exotic Couplings in Neutron Decay: A Measurement of the Transverse Polarization of Electrons
Nuclear Physics A **827**, 422c (2009)

Bergamaschi A, Cervellino A, Dinapoli R, Gozzo F, Henrich B, Johnson I, Kraft P, Mozzanica A, Schmitt B, Shi X
Photon counting microstrip detector for time resolved powder diffraction experiments
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **604**, 136 (2009)

Bertsch J, Goeltl L, Kirch K, Lauss B, Zubler R
Neutron radiation hardness of vacuum compatible two-component adhesives
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **602**, 552 (2009)

K. Bodek et al.
Additional results from the first dedicated search for neutron - mirror neutron oscillations
Particle Physics with Slow Neutrons ILL, 2008
Nucl. Instr. Meth. A **611** (2009) 141

Braem A, Joram C, Seguinot J, Dissertori G, Djambazov L, Lustermann W, Nessi-Tedaldi F, Pauss F, Schinzel D, Solevi P, Lacasta C, Oliver JF, Rafecas M, De Leo R, Nappi E, Vilardi I, Chesi E, Cochran E, Honscheid K, Kagan H, Rudge A, Smith S, Weilhammer P, Johnson I, Renker D, Clinthorne N, Huh S, Bolle E, Stapnes S, Meddi F
AX-PET: A novel PET detector concept with full 3D reconstruction
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **610**, 192 (2009)

Braun I, Commichau SC, Rissi M, Backes M, Biland A, Bretz T, Britvitch I, Commichau V, von Gunten H, Hildebrand D, Horisberger U, Kranich D, Lorenz E, Lustermann W, Mannheim K, Neise D, Pauss F, Pohl M, Renker D, Rhode W, Roser U, Straumann U, Viertel G
First Avalanche-photodiode camera test (FACT): A novel camera using G-APDs for the Observation of Very High-Energy Gamma-Rays With Cherenkov Telescopes
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **610**, 400 (2009)

Bredenstein A, Denner A, Dittmaier S, Pozzorini S
Next-To-Leading Order QCD Corrections to pp -> t(t)over-barb(b)over-bar + X at the LHC
Physical Review Letters **103**, 012002 (2009)

Brod J, Fugel F, Kniehl BA
Two-loop electroweak corrections to the A(0)gamma gamma and A(0)gg couplings of the CP-odd Higgs boson
Nuclear Physics B **807**, 188 (2009)

Bychkov M, Pocanic D, VanDevender BA, Baranov VA, Bertl W, Bystritsky YM, Frlez E, Kalinnikov VA, Khomutov NV, Korenchenko AS, Korenchenko SM, Korolija M, Kozlowski T, Kravchuk NP, Kuchinsky NA, Li W, Mekterovic D, Mzhavia D, Ritt S, Robmann P, Rondon-Aramayo OA, Rozhdestvensky AM, Sakhelashvili T, Scheu S, Straumann U, Supek I, Tsamalaidze Z, van der Schaaf A, Velicheva EP, Volnykh VP, Wang Y, Wirtz HP
New Precise Measurement of the Pion Weak Form Factors in pi(+) -> e(+) nu gamma Decay
Physical Review Letters **103**, 051802 (2009)

Caminada L, Starodumov A
Building and commissioning of the CMS pixel barrel detector
Journal of Instrumentation **4**, P03017 (2009)

Casse G
Overview of the recent activities of the RD50 collaboration on radiation hardening of semiconductor detectors for the sLHC
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **598**, 54 (2009)

P. W. Cattaneo
First results from the MEG experiment: m->e gamma
International conference on Neutrino Physics in the LHC Era, Luxor, Egypt 15/19-11-2009

F. Cei
The MEG Experiment at PSI
NOW2008, Neutrino Oscillation Workshop, Conca Specchiulla (Otranto, Lecce, Italy), September 6-13, 2008
Nucl. Phys. B **188** (2009) 309-314

Covita DS, Anagnostopoulos DF, Gorke H, Gotta D, Gruber A, Hirtl A, Ishiwatari T, Indelicato P, Bigot EO, Nekipelov M, dos Santos JMF, Schmid P, Simons LM, Trassinelli M, Veloso JFCA, Zmeskal J
Line Shape of the mu H(3p-1s) Hyperfine Transitions
Physical Review Letters **102**, 023401 (2009)

Denner A, Dittmaier S, Gehrmann T, Kurz C
Electroweak corrections to three-jet production in e(+)e(-) annihilation
Physics Letters B **679**, 219 (2009)

Denner A, Dittmaier S, Kasprzik T, Muck A
Electroweak corrections to W plus jet hadroproduction including leptonic W-boson decays
Journal of High Energy Physics , 075 (2009)

Geltenbort P, Goltl L, Henneck R, Kirch K, Knecht A, Kuzniak M, Lauss B, Lefort T, Mtchedlishvili A, Meier M, Negrazus M, Petzoldt G, Ruettimann P, Vrankovic V, Zsigmond G
A compact, large-diameter adiabatic spinflipper for ultracold neutrons
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **608**, 132 (2009)

M. Gericke et al. (B. Lauss / PSI)
Parity violation in neutron proton capture – The NPDGamma experiment
Particle Physics with Slow Neutrons ILL, 2008
Nucl. Instr. Meth. A **611** (2009) 239

Henrich B, Bergamaschi A, Broennimann C, Dinapoli R, Eikenberry EF, Johnson I, Kobas M, Kraft P, Mozzanica A, Schmitt B
Pilatus: A single photon counting pixel detector for X-ray applications
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **607**, 247 (2009)

Hollik W, Plehn T, Rauch M, Rzehak H
Supersymmetric Higgs Bosons in Weak Boson Fusion
Physical Review Letters **102**, 091802 (2009)

Iwamoto T, Sawada R, Haruyama T, Mihara S, Doke T, Hisamatsu Y, Kasami K, Maki A, Mori T, Natori H, Nishiguchi H, Nishimura Y, Ootani W, Terasawa K, Uchiyama Y, Yamada S
Development of a large volume zero boil-off liquid xenon storage system for muon rare decay experiment (MEG)
Cryogenics **49**, 254 (2009)

Javanainen A, Sillanpaa M, Trzaska WH, Virtanen A, Berger G, Hajdas W, Harboe-Sorensen R, Kettunen H, Malkiewicz T, Mutterer M, Perkowski J, Pirojenko A, Riihimaki I, Sajavaara T, Tyurin G, Whitlow HJ
Experimental Linear Energy Transfer of Heavy Ions in Silicon for RADEF Cocktail Species
IEEE Transactions on Nuclear Science **56**, 2242 (2009)

Johnson I, Sadygov Z, Bunk O, Menzel A, Pfeiffer F, Renker D
A Geiger-mode avalanche photodiode array for X-ray photon correlation spectroscopy
Journal of Synchrotron Radiation **16**, 105 (2009)

Kalantar-Nayestanaki N, Moeini H, Mahjour-Shafiei M, Aksouh F, Beckert K, Beller P, Boretzky K, Chatillon A, Corsi A, Egelhof P, Emling H, Ickert G, Ilieva S, Kozhuharov C, Le Bleis T, Le Xuang XC, Litvinov Y, Mahata K, Meier JP, Nolden F, Popp U, Simon H, Steck M, Stohlker T, Weick H, Zalite A, Kiselev O, Jourdan J, Kiselev D, Werthmuller D, Paschalis S
First Feasibility Study For Exl With Prototype Detectors At The Esr And Detector Simulations
International Journal of Modern Physics E-Nuclear Physics **18**, 524 (2009)

Kampf K, Moussallam B
Chiral expansions of the pi(0) lifetime
Physical Review D **79**, 076005 (2009)

Kiselev OA
Positron spectrometer of MEG experiment at PSI
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors and Associated Equipment **604**, 304 (2009)

Kodolova O, Murray M
Heavy Ion Physics with CMS
Nuclear Physics A **830**, 97c (2009)

Kotlinski D
Status of the CMS Pixel detector
Journal of Instrumentation **4**, P03019 (2009)

Kozela A, Ban G, Bialek A, Bodek K, Gorel P, Kirch K, Kistryn S, Kuzniak M, Naviliat-Cuncic O, Pulut J, Severijns N, Stephan E, Zejma J
Measurement of the Transverse Polarization of Electrons Emitted in Free-Neutron Decay
Physical Review Letters **102**, 172301 (2009)

Kraft P, Bergamaschi A, Broennimann C, Dinapoli R, Eikenberry EF, Henrich B, Johnson I, Mozzanica A, Schleputz CM, Willmott PR, Schmitt B
Performance of single-photon-counting PILATUS detector modules
Journal of Synchrotron Radiation **16**, 368 (2009)

Kraft P, Bergamaschi A, Bronnimann C, Dinapoli R, Eikenberry EF, Graafsma H, Henrich B, Johnson I, Kobas M, Mozzanica A, Schleputz CA, Schmitt B
Characterization and Calibration of PILATUS Detectors
IEEE Transactions on Nuclear Science **56**, 758 (2009)

Kraft-Bermuth S, Andrianov VA, Bleile A, Echler A, Egelhof P, Kiseleva A, Kiselev O, Meier HJ, Meier JP, Shrivastava A, Weber M, Golser R, Kutschera W, Priller A, Steier P, Vockenhuber C
Calorimetric low temperature detectors for low-energetic heavy ions and their application in accelerator mass spectrometry
Review of Scientific Instruments **80**, 103304 (2009)

Kramer M, Popenda E, Spira M, Zerwas PM
Gluino polarization at the LHC
Physical Review D **80**, 055002 (2009)

Kumar A
Commissioning of the CMS Forward Pixel Detector
Journal of Instrumentation **4**, P03026 (2009)

B. Lauss
Fundamental measurements with muons – View from PSI
Nucl. Phys. A **827**, 1-4 (2009) 401c-407c

Maierbeck P, Gernhauser R, Krucken R, Kroll T, Alvarez-Pol H, Aksouh F, Aumann T, Behr K, Benjamim EA, Benlliure J, Bildstein V, Bohmer M, Boretzky K, Borge MJG, Brunle A, Burger A, Caamano M, Casarejos E, Chatillon A, Chulkov LV, Cortina-Gil D, Enders J, Eppinger K, Faestermann T, Friese J, Fabbietti L, Gascon M, Geissel H, Gerl J, Gorska M, Hansen PG, Jonson B, Kanungo R, Kiselev O, Kojouharov I, Klimkiewicz A, Kurtukian T, Kurz N, Larsson K, Le Bleis T, Mahata K, Maier L, Nilsson T, Nociforo C, Nyman G, Pascual-Izarra C, Perea A, Perez D, Prochazka A, Rodriguez-Tajes C, Rossi D, et al.
Structure of Ti-55 from relativistic one-neutron knockout
Physics Letters B **675**, 22 (2009)

Martinez G, Barcyzk A, Berdugo J, Casaus J, Casella C, De Laere S, Deiters K, Dick P, Kirkby J, Malgeri L, Mana C, Marin J, Pohl M, Petitjean C, Sanchez E, Willmott C
The second level trigger system of FAST
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors and Associated Equipment **609**, 235 (2009)

Mayer S, Rauch H, Geltenbort P, Schmidt-Wellenburg P, Allenspach P, Zsigmond G
New aspects for high-intensity neutron beam production
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors and Associated Equipment **608**, 434 (2009)

Mozzanica A, Bergamaschi A, Dinapoli R, Gozzo F, Henrich B, Kraft P, Patterson B, Schmitt B
MythenII: A 128 channel single photon counting readout chip
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **607**, 250 (2009)

Muhlleitner M, Rzehak H, Spira M
MSSM Higgs boson production via gluon fusion: the large gluino mass limit
Journal of High Energy Physics, 023 (2009)

Mukha I, Timofeyuk NK, Summerer K, Acosta L, Alvarez MAG, Casarejos E, Chatillon A, Cortina-Gil D, Espino JM, Fomichev A, Garcia-Ramos JE, Geissel H, Gomez-Camacho J, Grigorenko L, Hofmann J, Kiselev O, Korsheninnikov A, Kurz N, Litvinov Y, Martel I, Nociforo C, Ott W, Pfutzner M, Rodriguez-Tajes C, Roeckl E, Stanoiu M, Weick H, Woods PJ
Observation of narrow states in nuclei beyond the proton drip line: F-15 and Ne-16
Physical Review C **79**, 061301 (2009)

Musienko Y, Renker D, Charifoulline Z, Deiters K, Reucroft S, Swain J
Study of radiation damage induced by 82 MeV protons on multi-pixel Geiger-mode avalanche photodiodes
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **610**, 87 (2009)

Otte AN, Britvitch I, Biland A, Goebel F, Lorenz E, Pauss F, Renker D, Roser U, Schweizer T
Detection of Cherenkov light from air showers with Geigermode-APDs
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **610**, 415 (2009)

Pattie RW, Anaya J, Back HO, Boissevain JG, Bowles TJ, Broussard LJ, Carr R, Clark DJ, Currie S, Du S, Filippone BW, Geltenbort P, Garcia A, Hawari A, Hickerson KP, Hill R, Hino M, Hoedl SA, Hogan GE, Holley AT, Ito TM, Kawai T, Kirch K, Kitagaki S, Lamoreaux SK, Liu CY, Liu J, Makela M, Mammei RR, Martin JW, Melconian D, Meier N, Mendenhall MP, Morris CL, Mortensen R, Pichlmaier A, Pitt ML, Plaster B, Ramsey JC, Rios R, Sabourov K, Sallaska AL, Saunders A, Schmid R, Seestrom S, Servicky C, Sjue SKL, Smith D, Sondheim WE, Tatar E, Teasdale W, et al.
First Measurement of the Neutron beta Asymmetry with Ultracold Neutrons
Physical Review Letters **102**, 012301 (2009)

Petitjean C
Muon capture experiments in hydrogen and deuterium
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **600**, 338 (2009)

Prokscha T, Scheuermann R, Hartmann U, Raselli A, Suter A, Amato A, Nieuwenhuys GJ, Dijksmann A, Gartner F, Greuter U, Mutter S, Schlumpf N, Morenzoni E
A novel VME based mu SR data acquisition system at PSI
Physica B-Condensed Matter **404**, 1007 (2009)

Radicci V
CMS pixel detector upgrade
Journal of Instrumentation **4**, P03022 (2009)

Renker D
New developments on photosensors for particle physics
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **598**, 207 (2009)

Renker D, Lorenz E
Advances in solid state photon detectors
Journal of Instrumentation **4**, P04004 (2009)

Ripa J, Meszaros A, Wigger C, Huja D, Hudec R, Hajdas W
Search for gamma-ray burst classes with the RHESSI satellite
Astronomy & Astrophysics **498**, 399 (2009)

Rosenfelder R
Path integrals for potential scattering
Physical Review A **79**, 012701 (2009)

Rosenfelder R
Perturbation theory without diagrams: The polaron case
Physical Review E **79**, 016705 (2009)

Ryan M
The CMS electromagnetic calorimeter at the LHC
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment 598, 217(2009)

Sobott BA, Broennimann C, Eikenberry EF, Dinapoli R, Kraft P, Taylor GN, Willmott PR, Schleputz CM, Rassool RP
Synchrotron radiation hardness studies of PILATUS II
Journal of Synchrotron Radiation **16**, 489 (2009)

Suarez-Garcia E, Hajdas W
Polar: Design of a novel X-ray polarimeter based on plastic scintillators and MAPMTs
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **610**, 276 (2009)

OTHER PUBLICATIONS

K. Kirch, B. Lauss
Teilchenphysik mit ultrakalten Neutronen
Physik-AT - 2008/4 - Dez.2008

CONFERENCE, WORKSHOP AND SEMINAR CONTRIBUTIONS

J. Adam
Status of the MEG Experiment
Joint Annual meeting of the Austrian, Swiss Physical Societies & Austrian Society of Astronomy & Astrophysics, Innsbruck, Austria, 2-4 September 2009

Barron-Palos L, Alarcon R, Alonzi LP, B.Lauss, et al.
Measurement of parity-violating neutron capture gamma asymmetries at low-energies
XXXII Symposium on Nuclear Physics
Hotel Hacienda, Morelos, México, January 5 - 8, 2009
Revista mexicana de fisica vol.55, 2 (2009) 18-22.

P. W. Cattaneo
The MEG spectrometer at PSI
1st international conference on Technology and Instrumentation in Particle Physics 2009, TIPP09, Tsukuba, Japan, 12-17 March 2009

M. Daum
Results from R&D experiments for building a new ultracold neutron source at PSI
Gemeinsame Jahrestagung 2009 der OePG und SPG
Universität Innsbruck, 2.-4. Sep. 2009

A. Denner, S. Dittmaier, T. Kasprzik, A. Mück
Electroweak Corrections to W + Jet Hadroproduction Including Leptonic W-Boson Decays
Proceedings of the 2009 Europhysics Conference on High Energy Physics: HEP 2009 (EPS-HEP 2009),
Cracow (Poland), 16 - 22 Jul 2009
arXiv: 0909.3943 [hep-ph]

A. De Roeck et al. (PSI: G. Chachamis)
From the LHC to Future Colliders
CERN Theory Institute Summary Report, CERN, Geneva (Switzerland), 9 - 27 February 2009.
arXiv: 0909.3240 [hep-ph]

W. Erdmann
Upgrade Plans for the CMS Pixel Detector
11th Pisa Meeting on Advanced Detectors
La Biodola, Isola d'Elba (Italy), May 24 - 30, 2009

L. Göltl
Development of a Monitoring System for the Ultracold Neutron Source at PSI
Gemeinsame Jahrestagung 2009 der OePG und SPG
Universität Innsbruck, 2.-4. Sep. 2009

W. Hajdas, G. Berger
technical chairmen for Dosimetry and Facilities session
RADECS 2009, 10th European Components on Radiation Effects on Components and Systems
Bruges, Belgium, 14-18 September 2009

ECIF – Wojtek Hajdas, Guy Berger, Ari Virtanen, Bob Nickson
News from the European Component Irradiation Facilities, PIF, HIF/LIF, RADEF & ECF
The 9th ESA QCA Final Presentation Day
Paul Scherrer Institut, January 27th 2009

W. Hajdas
Ground Test Facilities - Commonly Used
The 3rd RADECS Thematic Workshop on "Single Event Transients"
Paul Scherrer Institut, January 29th 2009

W. Hajdas
Low Energy Electron Monitor
Radiation Monitors Round Table
Centre National d'Etudes Spatiales (CNES), Toulouse, France

M. Hildebrandt
The Drift Chamber System of the MEG Experiment
1st international conference on Technology and Instrumentation in Particle Physics 2009, TIPP09, Tsukuba, Japan, 12-17 March 2009

M. Horras
The mercury co-magnetometer in the nEDM-experiment
Gemeinsame Jahrestagung 2009 der OePG und SPG
Universität Innsbruck, 2.-4. Sep. 2009

Hurley K., Atteia J. -L., Barraud C., Pelangeon A., Boer M., Vanderspek R., Ricker G, Mazets E., Golenetskii S., Frederiks D. D., Pal'shin V. D., Aptekar R. L., Smith D. M., Wigger C., Hajdas W., Rau A., von Kienlin A., Mitrofanov I. G., Golovin D. V., Kozyrev A. S., Litvak M. L., Sanin A. B., Boynton W., Fellows C., Barthelmy K., Harshman S., Cline T., Cummings J., Gehrels N., Krimm H., Yamaoka K., Ohno M., Fukazawa Y,; Hanabata Y., Takahashi T., Tashiro M., Terada Y., Murakami T., Makishima K., Guidorzi C., Frontera F., Montanari C. E., Rossi F., Trombka J., McClanahan T., Goldsten R. , Starr J., Gold R.
The Interplanetary Network Supplement to the HETE-2 Gamma-Ray Burst Catalog
eprint arXiv:0907.2709

Hurley K., Rowlinson A., Bell E., Perley D., Mitrofanov I. G., Golovin D. V., Kozyrev A. S., Litvak M. L., Sanin A. B., Boynton W., Fellows C., Harshmann K., Ohno M., Yamaoka K., Nakagawa Y. E., Smith D. M., Cline T., Tanvir N. R., O'Brien P. T,; Wiersema K., Rol E., Levan A., Rhoads J., Fruchter A., Bersier D., Kavelaars J. J., Gehrels N., Krimm H., Palmer D. M., Duncan R. C., Wigger C., Hajdas W., Atteia J. -L., Ricker G., Vanderspek R., Rau A., von Kienlin A.
A new analysis of the short-duration, hard-spectrum GRB 051103, a possible extragalactic SGR giant flare
eprint arXiv:0907.2462

T. Iwamoto
System overview of liquid xenon calorimeter for the MEG experiment
11th Pisa meeting on advanced detectors, La Biodola, Isola d'Elba, Italy, 24 - 30 May 2009

H. C. Kästli
A low mass pixel detector upgrade for CMS
9th International Conference on Large Scale Applications and Radiation Hardness of Semiconductor Detectors
Florence (Italy), 30 September – 2 October 2009

H.C, Kästli
System architecture and requirements: CMS pixel
Second common ATLAS CMS Electronics Workshop for SLHC
CERN, 3-4 March 2009

K. Kampf
Chiral Expansion for π^0 decays
Proceedings of the International Workshop on Effective Field Theories: From the Pion to the Upsilon
(EFT 09), Valencia (Spain), 2 - 6 February 2009, p. 030
arXiv: 0905.0585 [hep-ph]

K. Kampf, J. Novotny and J. Trnka
Note on Renormalization of the Spin-1 Resonance Propagator at One Loop Order
Proceedings of the International Workshop on Effective Field Theories: From the Pion to the Upsilon
(EFT 09), Valencia (Spain), 2 - 6 February 2009, p. 13
arXiv: 0905.1348 [hep-ph]

A. Knecht
A New Experiment Searching for the Neutron Electric Dipole Moment
Gemeinsame Jahrestagung 2009 der OePG und SPG
Universität Innsbruck, 2.-4. Sep. 2009

B. Lauss
UCN guides for the ultra cold neutron source at PSI
Workshop on Neutron Delivery Systems
Institut Laue-Langevin, France, 1 - 3 juillet 2009

B. Lauss
The ultracold neutron source at the Paul Scherrer Institut: cool-down soon!
Gemeinsame Jahrestagung 2009 der OePG und SPG
Universität Innsbruck, 2.-4. Sep. 2009

Beat Meier
Pixel Front-end development for CMS
VERTEX 2009, Veluwe, the Netherlands, September 13-18 2009

E. Pierre
Adiabatic spin flipper for UCN in combination with a SC polarizer magnet
Workshop on Neutron Delivery Systems
Institut Laue-Langevin, France, 1 - 3 July 2009

E. Pierre
Adiabatic spin flipper for UCN in combination with a SC polarizer magnet for the nEDM experiment
Gemeinsame Jahrestagung 2009 der OePG und SPG
Universität Innsbruck, 2.-4. Sep. 2009

D. Pocanic, L. P. Alonzi, V. A. Baranov, W. Bertl, M. Bychkov, Yu.M. Bystritsky, E. Frlež, V.A. Kalinnikov, N.V. Khomutov, A.S. Korenchenko, S.M. Korenchenko, M. Korolija, T. Kozlowski, N.P. Kravchuk, N.A. Kuchinsky, D. Mekterovic, D. Mzhavia, A. Palladino, P. Robmann, A.M. Rozhdestvensky, S.N. Shkarovskiy, U. Straumann, I. Supek, P. Truöl, Z. Tsamalaidze¶, A. van der Schaaf, E.P. Velicheva and V.P. Volnykh
PEN experiment: a precise measurement of the $\pi^+ \to e^+$decay branching fraction
CIPANP 2009, Tenth Conference on the Intersections of Particle and Nuclear Physics
San Diego, California, 26 May to 31 May, 2009

D. Pocanic, M. Bychkov, B.A. VanDevender, L.P. Alonzi, V.A. Baranov, W. Bertl, Yu.M. Bystritsky, E. Frlež, N.V. Khomutov, A.S. Korenchenko, S.M. Korenchenko, M. Korolija, T. Kozlowski, N.P. Kravchuk, N.A. Kuchinsky, D. Mekterovic, D. Mzhavia, A. Palladino, P. Robmann, A.M. Rozhdestvensky, U. Straumann, I. Supek, P. Truöl, A. van der Schaaf, E.P. Velicheva, V.P. Volnykh
Rare pion and muon decay measurements: the PIBETA and PEN experiments
Sixth International Workshop on Chiral Dynamics
6-10 July 2009, Bern, Switzerland

T. Rohe, A. Bean, W. Erdmann, H.-C. Kaestli, S. Khalatyan, B. Meier, V. Radicci, J. Sibille
Radiation hardness of CMS pixel barrel modules
11th European Symposium on Semiconductor Detectors
Wildbad Kreuth, Germany, June 7-11, 2009

St. Ritt
Application of the 5 GS/s Waveform Digitizing Chip DRS4
16th IEEE NPSS Real Time Conference, Beijing, China, May 10-15, 2009

St. Ritt
Fast Waveform Digitizing in Radiation Detection using Switched Capacitor Arrays
CMOS Emerging Technologies Workshop, Vancouver, Canada, Sept. 23-25, 2009

St. Ritt
WaveDREAM - a Digitizer Board based on the DRS4 6 GS/s 12 Bit Sampling Chip wiht GBit Ethernet Readout
IEEE NPSS NSS/MIC Conference, Orlando, Florida, 25-31 Oct., 2009

St. Ritt
Application of the DRS Chip for Fast Waveform Digitizing
1st international conference on Technology and Instrumentation in Particle Physics 2009, TIPP09, Tsukuba, Japan 12-17 March 2009

St. Ritt, U. Hartmann
DRS4 - The Oscilloscope-on-a-Chip
Hannovermesse, April 20-24, 2009

R. Sawada
Performance of liquid xenon gamma ray detector for MEG
1st international conference on Technology and Instrumentation in Particle Physics 2009, TIPP09, Tsukuba, Japan, 12-17 March 2009

M. Spira
Higgs Physics at e^+e^- and Photon Colliders
Proceedings of the International Conference on the Structure and the Interactions of the Photon (Photon 09), Hamburg, Germany, 11 - 15 May 2009.
https://indico.desy.de/conferenceOtherViews.py?view=nicecompact\&confId=140
A. Starodumov

Proceedings of the workshop: HERA and the LHC workshop series on the implications of HERA for LHC physics.
Z.J. Ajaltouni et al. DESY-PROC-2009-02, Mar 2009.
Proceedings of HERA and the LHC: 2nd Workshop on the Implications of HERA for LHC Physics, Geneva, Switzerland, 6-9 Jun 2006, Hamburg, Germany, 12-16 Mar 2007, Geneva, Switzerland, 26-30 May 2008
e-Print: arXiv:0903.3861 [hep-ph]

Y. Uchiyama
Gamma ray reconstruction with liquid xenon calorimeter for the MEG experiment
11th Pisa meeting on advanced detectors, La Biodola, Isola d'Elba, Italy, 24 - 30 May 2009

David A. Watts, Ugo Amaldi, Apollo Go, Y-.H Chang, Wojtek Hajdas, Sarolta Iliescu, Nail Malakhov, Jerome Samarati, and Fabio Sauli
A Proton Range Telescope for Quality Assurance in Hadrontherapy
Innovative Techniques for Hadron Therapy, IEEE NSS MIC 2009, Orlando, October, 29, 2009

M. Zdrahal, K. Kampf, M. Knecht and J. Novotny
Dispersive Construction of Two-Loop $P \rightarrow 3\,\pi$ ($P = K,\eta$) Amplitudes
Proceedings of the International Workshop on Effective Field Theories: From the Pion to the Upsilon
(EFT 09), Valencia (Spain), 2 - 6 February 2009, p. 063
arXiv: 0905.4868 [hep-ph]

G. Zsigmond
Monte Carlo optimization of the polarized beamlines of the ultracold neutron source at PSI
Workshop on Neutron Delivery Systems
Institut Laue-Langevin, France, 1 - 3 July 2009

G. Zsigmond
A phase-space-transformer based ultracold neutron source for the European Spallation Source
Neutrino, Neutron, Nuclear, Medical and Muon Physics at ESS
Lund, Sweden. 2 December

Stefan König
Upgrade of the CMS Pixel Detector
VERTEX 2009, Veluwe, the Netherlands, September 13-18 2009

PROCEEDINGS

Bell E. C., Bandstra M. E., Boggs St. E., Hajdas W., Hurley K., Smith D. M., Wigger C.
Time-Resolved Spectroscopy of RHESSI GRBs
GAMMA-RAY BURST: Sixth Huntsville Symposium.
AIP Conference Proceedings **1133**, pp. 31-33 (2009).

P. Biallass [CMS Collaboration]
MUSiC: A general search for deviations from Monte Carlo predictions in CMS
J.Phys. Conf. Ser. **171** (2009) 012102

P. W. Cattaneo
Lepton Flavour Violation perspectives beyond MEG
NOW2008, Neutrino Oscillation Workshop, Conca Specchiulla (Otranto, Lecce, Italy), September 6-13, 2008
Nucl. Phys. B **188** (2009) 351-354

R. Dinapoli, A. Bergamaschi, B. Henrich, R. Horisberger, I. Johnson, P. Kraft, A. Mozzanica, B. Schmitt, X. Shi, D. Suter
A new family of pixel detectors for high frame rate X-ray applications
11th Pisa Meeting on Advanced Detectors,
La Biodola, Isola d'Elba (Italy) May 24 - 30, 2009)
doi:10.1016/j.nima.2009.10.043

Hurley K., Cline T., Mitrofanov I. G., Golovin D., Litvak M. L., Sanin A. B., Boynto, W., Fellows C., Harshma, K., Starr R., Golenetskii S., Aptekar R., Mazets E., Pal'Shin V., Frederiks D., Smith D. M., Wigger C., Hajdas W., Zehnder A., von Kienlin A., Licht, G. G., Rau A., Yamaoka K., Ohno M., Fukazawa Y., Takahashi T., Tashiro M., Terada Y., Murakami T., Makishima K., Barthelmy S., Cummings J., Gehrels N., Krimm H., Goldsten J., Del Monte E., Feroci M., Marisaldi M.
The Status and Future of the Third Interplanetary Network
Gamma-Ray Burst: Sixth Huntsville Symposium.
AIP Conference Proceedings **1133**, pp. 55-57 (2009)

K. Kampf, J. Novotny and J. Trnka,
Renormalization of the Antisymmetric Tensor Field Propagator and Dynamical Generation of the 1^{+-} Mesons in Resonance Chiral Theory
Proceedings of 14th High-Energy Physics International Conference in Quantum Chromodynamics (QCD 08),
Montpellier (France), 7 - 12 July 2008.
Nucl. Phys. Proc. Suppl. **186**, 153 (2009)

K. Kampf, M. Knecht, J. Novotny and M. Zdrahal,
Dispersive Representation of $K \rightarrow 3\,\pi$ Amplitudes and Cusps
Proceedings of 14th High-Energy Physics International Conference in Quantum Chromodynamics (QCD 08),
Montpellier (France), 7 - 12 July 2008.
Nucl. Phys. Proc. Suppl. **186**, 334 (2009)

H. Kästli
Integration and installation of the CMS pixel Barrel Detector
Proceedings of the 17th International Workshop on Vertex Detectors (Vertex2008)
Island (Sweden), 28 july – 1 August 2008
PoS (Vertex 2008)0083, July 2009

W. Lustermann [CMS ECAL Collaboration]
The electromagnetic calorimeter of CMS, summary and status
J. Phys. Conf. Ser. **160** (2009) 012044

McConnell M. L., Angelini L., Baring M. G., Barthelmy S., Black J. K., Bloser P. F., Dennis B., Emslie A. G., Greiner J., Hajdas W., Harding A. K., Hartmann D. H., Hill J. E., Ioka K., Kaaret P., Kanbach G., Kniffen D., Legere J. S., Macri J. R., Morris R., Nakamura T., Produit N., Ryan J. M., Sakamoto T., Toma K., Wu X., Yamazaki R., Zhang B.
GRB Polarimetry with POET
GAMMA-RAY BURST: Sixth Huntsville Symposium.
AIP Conference Proceedings **1133**, pp. 64-66 (2009)

R. Pohl,
2S State and Lamb Shift in Muonic Hydrogen
Hyperf. Int. **193**, 115-120 (2009)
Proceedings of the International Conference on Exotic Atoms (EXA 2008), Vienna, Austria,
15-18 September 2008)

Ripa J., Meszaros A., Wigger C., Huja D., Hudec R., Hajdas W.
GRB observed with RHESSI satellite (Ripa+, 2009)
VizieR On-line Data Catalog: J/A+A/498/399. Originally published in: 2009A&A.498.399R

R. Sawada
mu->e gamma – MEG
Tenth Conference on the Intersections of Particle and Nuclear Physics, San Diego, California, U.S., May 2009
AIP Conf. Proc. **1182**, (2009) 714-717

A. Schmidt [CMS Collaboration]
Beauty production and identification at CMS
Nucl. Phys. Proc. Suppl. **187** (2009) 216

K.A. Ulmer [CMS Collaboration]
Prospects for measurements of rare B decays and other heavy flavour physics at CMS,
Nucl. Phys. Proc. Suppl. **187** (2009) 57

C. Voena
The search for mu->e+gamma decay: status of the MEG experiments
IFAE2009, Bari, Italy, April 15-17 2009
Il Nuovo Cimento **32C**, (2009) 253-256

Řípa, J.; Mészáros, A.; Wigger, C.; Huja, D.; Hudec, R.; Hajdas, W.
Search for gamma-ray burst classes with the RHESSI satellite
Astronomy and Astrophysics 498, Issue 2 (2009) pp.399-406

De Korte, Piet; Anquita, J.; Barcons, X.; Bastia, P.; Beyer, J.; Briones, F.; Bruijn, M.; Bussons, J.; Camón, A.; Carrera, F.; Ceballos, M.; Colasanti, L.; Dirks, B.; Drung, D.; Fabrega, L.; Gatti, F.; Gonzalez-Arrabal, R.; Gonzalez-Arrabal, R.; Gottardi, L.; Hajdas, W.; Helistö, P.; den Herder, J.; Hoevers, H.; Ishisaki, Y.; Kiviranta, M.; van der Kuur, J.; Macculi, C.; Mchedlischvili, A.; Mitsuda, K.; Paltani, S.; Parra-Borderías, M.; Piro, L.; Rohlfs, R.; Sese, J.; Takei, Y.; Torrioli, G.; Yamasaki, N.
Eureca - A European-japanese Micro-calorimeter Array Under Development for IXO
American Astronomical Society, AAS Meeting #213, #457.14;
Bulletin of the American Astronomical Society 41, p.360

INVITED TALKS 2009

F. Cei
First results of the MEG Experiment at PSI
Seminar: Perugia, 11th Nov. 2009

G. Chachamis
Two-Loop QCD Amplitudes for $q q \to W W$ at Hadron Colliders
IPPP seminar talk, Durham University, Durham (United Kingdom), 26 November 2009

A. Denner
NLO Corrections to $pp\to t\bar{t b\bar{b+X$ at the LHC
Workshop on Higgs Boson Phenomenology, Zurich (Switzerland), 7 - 9 January 2009

A. Denner
Electroweak Radiative Corrections for the LHC (2 lectures)
Training event: MC4LHC: from parton showers to NNLO, CERN,
Geneva (Switzerland), 4 - 8 May 2009

A. Denner
Quantenkorrekturen für die Suche nach dem Higgs-Boson am LHC
Seminar Elementarteilchentheorie, Würzburg (Germany), 15 July 2009

A. Denner
Techniques and Concepts for Higher-Order Calculations
DESY Theory Workshop: Collider Phenomenology, Hamburg (Germany), 29 September 2009

A. Denner
Reliable Predictions for Multiparticle Processes at the LHC
Theory Seminar, Bern (Switzerland), 20 November 2009

R. Dinapoli
Status of the EIGER photon counting system
Medipix Collaboration Meeting, CERN, Geneva, November 19, 2009

W. Hajdas
Projekt Weltraumwetter-Monitoring
Forum der TECHNOPARK-Allianz
Science & Fiction– Innovationen aus der Raumforschung
TECHNOPARK Zürich,3. März 2009

W. Hajdas
Projekt Gamma Ray Polarimeter durch
Forum der TECHNOPARK-Allianz
Science & Fiction– Innovationen aus der Raumforschung
TECHNOPARK Zürich, 3. März 2009

H.C. Kästli
Hybrid Pixel Detectors for Particle and x-ray Detection
Physics Colloquium, University of Nebraska, Lincoln (USA), 17 September 2009

H.C. Kästli
A low mass 4 layer pixel system for CMS
15th RD50 Workshop, CERN, 16-18 November 2009

S. Kallweit
NLO QCD Corrections to WW +Jet Production Including Leptonic W Decays at Hadron Colliders
DPG Frühjahrstagung der Deutschen Physikalischen Gesellschaft, München (Germany),
10 March 2009

S. Kallweit
NLO QCD Corrections to WW +Jet Production Including Leptonic W Decays at Hadron Colliders
Particle Physics Seminar, University of Zurich (Switzerland), 20 October 2009

S. Kallweit
NLO QCD Corrections to WW +Jet Production Including Leptonic W Decays at Hadron Colliders
IPPP Seminar, Durham (United Kingdom), 22 October 2009

S. Kallweit
NLO QCD Corrections to WW +Jet Production Including Leptonic W Decays at Hadron Colliders
9th International Symposium on Radiative Corrections (RADCOR 2009)
Applications of Quantum Field
Theory to Phenomenology, Ascona (Switzerland), 26 October 2009

K. Kirch
Precision Experiments with Cold and Ultracold Neutrons
European Nuclear Physics Conference and German Physical Society Spring Meeting
Bochum, Germany, March 19, 2009

K. Kirch
Ultrakalte Neutronen und die Suche nach dem elektrischen Dipolmoment des Neutrons
Physikalisch Technische Bundesanstalt
Berlin, Germany. September 16, 2009
K. Kirch
Towards a new measurement of the neutron electric dipole moment
Forschungszentrum Jülich
Jülich, Germany, October 26, 2009

K. Kirch
Overview of UCN Research -- Europe
Research Opportunities with Ultracold Neutrons in the US
Santa Fe, USA, November 7, 2009

K. Kirch
Ultracold Neutron Sources and Physics with UCN
Neutrino, Neutron, Nuclear, Medical and Muon Physics at ESS
Lund, Sweden, December 2, 2009

A. Knecht
Towards a New Measurement of the Neutron Electric Dipole Moment
Berkeley National Laboratory
Berkeley, USA. September 2009

A. Knecht
Towards a New Measurement of the Neutron Electric Dipole Moment
University of Washington
Seattle, USA. September 2009

A. Knecht
Towards a New Measurement of the Neutron Electric Dipole Moment
Argonne National Laboratory
Chicago, USA. September 2009

A. Knecht
Low Energy Fundamental Precision Experiments at PSI
CHIPP plenary meeting
Appenberg, Switzerland. August 2009

A. Knecht
Towards a New Measurement of the Neutron Electric Dipole Moment
Princeton University
Princeton, USA. July 2009

A. Knecht
Towards a New Measurement of the Neutron Electric Dipole Moment
Yale University;
New Haven, USA. July 2009

A. Knecht
Neutron to Mirror-Neutron Oscillations; presentation at the Excellence
Cluster Universe
Munich, Germany. April 2009

Meier F.
First Alignment of the Complete CMS Tracker
HSTD7 Hiroshima: Seventh International "Hiroshima" Symposium on the Development and Application of Semiconductor Tracking Detectors,
Hiroshima City (Japan), 29 Aug-1 Sep 2009

T. Mori
Rare Muon Decays and EDM
XXIV International Symposium on Lepton Photon Interactions at High Energies (Lepton Photon 09), Hamburg, Germany, 17-22 August 2009
D. Renker
APDs and Geiger-mode APDs for Cherenkov detectors
Workshop on fast Cherenkov detectors, Giessen, May 2009

D. Renker
Properties of state of the art Geiger-mode avalanche photodiodes
PD09, Shinshu University, June 24-26

D. Renker
Advances and problems of photon sensors with single photon detection capability
11th ICATPP Conf., Villa Olmo, Como 6. Oct. 2009

St. Ritt
Front-End Electronics for G-APDs
GSI, Darmstadt, Germany, 11 February 2009

T. Rohe et al.
A low mass 4 layer pixel system for CMS
ATLAS pixel upgrade meeting, CERN, 10. Nov. 2009

R. Rosenfelder
Path Integrals for Stochastic Scattering
Seminar, Universita' degli Studi di Trento, Povo/Trento (Italy), March 26, 2009

R. Rosenfelder
Exact Path-Integral Representations for the T-matrix in Nonrelativistic Potential Scattering
International Workshop on Relativistic Description of Two- and Three-Body Systems in Nuclear Physics,
ECT*, Trento (Italy), October 19 - 23, 2009

G. Signorelli
Status of MEG: an experiment to search for the mu -> e gamma decay at PSI
Reunions pleniere du GDR neutrino - session 2009, Paris (France) 28-29 April 2009

G. Signorelli
The mu->e gamma decay as a sensitive probe of physics beyond the SM: first results from MEG
Seminar: Universite Catholique de Louvain, Louvain-la-Neuve, Belgique, 3 December 2009

M. Spira
Higgs Couplings: Two-Loop Corrections and Decoupling Properties
Workshop on Higgs Boson Phenomenology, Zürich (Switzerland), 7 - 9 January 2009

M. Spira
New Developments in Higgs Physics
Workshop on Determining the Higgs Properties at the LHC
Seattle (USA), 12 - 16 January 2009

M. Spira
Associated MSSM Higgs Production with Heavy Quarks: SUSY-QCD Corrections
9th International Symposium on Radiative Corrections (RADCOR 2009): Applications of Quantum Field Theory to Phenomenology, Ascona (Switzerland), 25 - 30 October 2009

M. Spira
News on Higgs Production and Decays
ATLAS-Meeting, CERN, Geneva (Switzerland), 6 November 2009

A. Starodumov
B Physics potential of CMS
School for Particles and Accelerators, Institute for Studies in Physics and Mathematics
Isfahan, Iran, April 20-24 2009

LECTURES AND COURSES

M. Daum
Particle Physics Lectures, Universität Freiburg, WS

A. Denner
Das Standardmodell der elektroschwachen Wechselwirkung, ETH Zürich, HS 09

R. Horisberger
- Kern & Teilchenphysik Grundvorlesung , ETH Zürich, FS 09
- Elektronik fuer Physiker, Analog Teil, ETH Zürich, HS 09

U. Langenegger
Experimental Methods and Algorithms of Particle Physics, ETH Zürich

M. Spira
Einführung in die Quantenchromodynamik, ETH Zürich, FS 09

M. Spira and A. Mück
LTP-Colloquium, PSI, FS 09

M. Spira and G. Chachamis
LTP-Colloquium, PSI, HS 09

MEMBERSHIP IN EXTERNAL COMMITTEES

K. Kirch
- Committee of the Swiss Physical Society
- Swiss Correspondent for Nuclear Physics News
- Working group for fundamental interactions
- NuPECC Long Range Plan 2010

R. Horisberger
- President of the PSI internal FOKO
- Member of "Photon Science Commitee" Hasylab, DESY, Hamburg
- Member: Berufungskommission ETHZ, D-Phys   Nachfolge Prof. F. Pauss
- Member of CMS SLHC Upgrade Committee

U. Langenegger
- Member of International Advisory Committee for the conference "Flavor Physics and CP Violation"
- Member of Thesis committee for Silvia Taroni (Universita Milano-Bicocca), "Performance of the CMS Forward pixel Detector an dAnalysis of the Bc -> J/psi pi Decay Channel"
- Member of Thesis committee for Marco Pizzichemi (Universita Milano-Bicocca), "Interaction of Pulsed Electric Fields with Cell Membrane"

St. Ritt
- IEEE CANPS AdCom representative

T. Rohe
- RD50-Collaboration board (PSI representative)
- MC-PAD Supervisory board (PSI representative)

R. Rosenfelder
- Member of the Research Committee BVR at PSI

M. Spira
- Convenor of the working group 'Electroweak Gauge Theories and Alternative Theories' of the “ECFA Study of Physics and Detectors for a Linear Collider”

DIPLOMA

X. Bai
Calibration of Photomultipliers of the MEG LXe Detector
Master's Thesis: University of Tokyo, Japan, February 2009
Advisor: Prof. T. Mori

J. Carron (ETH Zürich)
Variational Methods for Path Integral Scattering Master thesis
Advisors: R. Rosenfelder (PSI), J. Fröhlich (ETH). March 2009

K. Gromova (ETH)
Study of the Cross-Section Measurement of the B+ Production at the CMS Experiment
Advisor: U. Langenegger (ETH)

R. Polster (Humbold Universitaet, Berlin)
Aufbau eines neuen Detektors für 25 ns timestamp tagged x-ray photon counting
12. Nov 2009

M. Stueckelberger (ETH)
Threshold Calibration of the CMS Pixel Detector
Advisors: U. Langenegger (ETH) und A. Starodumov (PSI)

DISSERTATIONS

Sarah Dambach (ETH),
CMS Pixel Module Readout Optimization and Study of the B0 Lifetime in the Semileptonic Decay Mode
ETH Zürich, 9.Januar 2009
Advisors: U. Langenegger (ETH), A. Starodumov (PSI)

Christina Eggel
CMS Pixel Module Qualification and Search for Bs->mu+mu-
ETH Zürich, 28. Januar 2009
Advisors: U. Langenegger (ETH), A. Starodumov (PSI)

Andreas Knecht
Towards a new measurement of the neutron electric dipole moment
Universität Zürich, 2009
Advisors: K.Kirch (PSI), U. Straumann (U. Zürich)

Christian Kurz
Electroweak corrections to three-jet production at electron-positron colliders Doctoral thesis
Universität Zurich, 28. August 2009
Advisors: A. Denner (PSI), Th. Gehrmann (U. Zürich)

A. Papa
Search for the Lepton Flavour Violation in $\mu \rightarrow e\gamma$. The calibration methods for the MEG experiment
Doctoral Thesis: School of Graduate Studies in Basic Sciences "Galileo Galilei"
University of Pisa, Italy, April 2009
Advisors: Prof. C. Bemporad

Condensed Matter Research with Neutrons and Muons

Laboratory for Neutron Scattering, ETH Zürich & Paul Scherrer Institut (LNS)

LIST OF PUBLICATIONS (PEER REVIEWED)

Ahmad A, Stahn J
Some improvement in Fe/Si multilayered neutron polarizor by modified sputtering geometry
Applied Surface Science **255**, 5902 (2009)

Alfonsov A, Vavilova E, Kataev V, Buechner B, Podlesnyak A, Russina M, Furrer A, Straessle T, Pomjakushina E, Conder K, Khomskii DI
Origin of a spin-state polaron in lightly hole doped LaCoO3
Journal of Physics: Conference Series **150**, 042003 (2009)

Aswal VK, Chodankar S, Kohlbrecher J, Vavrin R, Wagh AG
Small-angle neutron scattering study of protein unfolding and refolding
Physical Review E **80**, 011924 (2009)

Banachowicz E, Kozak M, Patkowski A, Meier G, Kohlbrecher J
High-pressure small-angle neutron scattering studies of glucose isomerase conformation in solution
Journal of Applied Crystallography **42**, 1 (2009)

Bernhard C, Drew AJ, Schulz L, Malik VK, Roessle M, Niedermayer CH, Wolf TH, Varma GD, Mu G, Wen HH, Liu H, Wu G, Chen XH
Muon spin rotation study of magnetism and superconductivity in BaFe2-xCoxAs2 and Pr1-xSrxFeAsO
New Journal of Physics **11**, 055050 (2009)

Blau B, Clausen KN, Gvasaliya S, Janoschek M, Janssen S, Keller L, Roessli B, Schefer J, Tregenna-Piggott P, Wagner W, Zaharko O
The Swiss Spallation Neutron Source SINQ at Paul Scherrer Institut
Neutron News **20 (3)**, 5 (2009)

Bodenthin Y, Schwarz G, Tomkowicz Z, Geue T, Haase W, Pietsch U, Kurth DG
Liquid Crystalline Phase Transition Induces Spin Crossover in a Polyelectrolyte Amphiphile Complex
Journal of The American Chemical Society **131**, 2934 (2009)

Bodenthin Y, Schwarz G, Tomkowicz Z, Lommel M, Geue TH, Haase W, Moehwald H, Pietsch U, Kurth DG
Spin-crossover phenomena in extended multi-component metallo-supramolecular assemblies
Coordination Chemistry Reviews **253**, 2414 (2009)

Braun A, Duval S, Ried P, Embs J, Juranyi F, Strassle T, Stimming U, Hempelmann R, Holtappels P, Graule T
Proton diffusivity in the BaZr0.9Y0.1O3-delta proton conductor
Journal of Applied Electrochemistry **39**, 471 (2009)

Braun A, Ovalle A, Pomjakushin V, Cervellino A, Erat S, C Stolte W, Graule T
Yttrium and hydrogen superstructure and correlation of lattice expansion and proton conductivity in the BaZr0.9Y0.1O2.95 proton conductor
Applied Physics Letters **95**, 22 (2009)

Brodeck M, Alvarez F, Arbe A, Juranyi F, Unruh T, Holderer O, Colmenero J, Richter D
Study of the dynamics of poly(ethylene oxide) by combining molecular dynamics simulations and neutron scattering experiments
Journal of Chemical Physics **130**, 094908 (2009)

Buchter F, Lodziana Z, Remhof A, Friedrichs O, Borgschulte A, Mauron PH, Zuettel A, Sheptyakov D, Palatinus L, Chlopek K, Fichtner M, Barkhordarian G, Bromann R, Hauback BC
Structure of the Orthorhombic y-Phase and Phase Transitions of Ca(BD4)2
Journal of Physical Chemistry C **113**, 17223 (2009)

Chakravarty S, Gupta M, Gupta A, Rajagopalan S, Balamurugan AK, Tyagi AK, Deshpande UP, Horisberger M, Gutberlet T
Fe and N self-diffusion in amorphous FeN: A SIMS and neutron reflectivity study
Acta Materialia **57**, 1263 (2009)

Chakravarty S, Huger E, Schmidt H, Horisberger M, Stahn J, P Lalla N
Determination of volume self-diffusivities in ultrafine-grained metals using neutron reflectometry
Scripta Materialia **61**, 1117 (2009)

Chang J, Christensen NB, Niedermayer C, Lefmann K, Ronnow HM, McMorrow DF, Schneidewind A, Link P, Hiess A, Boehm M, Mottl R, Pailhes S, Momono N, Oda M, Ido M, Mesot J
Magnetic-Field-Induced Soft-Mode Quantum Phase Transition in the High-Temperature Superconductor La1.855Sr0.145CuO4: An Inelastic Neutron-Scattering Study
Physical Review Letters **102**, 177006 (2009)

Chathoth SM, Damaschke B, Embs JP, Samwer K
Dynamics in Cu46Zr42Al7Y5 melts: Interplay between packing density and viscosity
Applied Physics Letters **94**, 201906 (2009)

Chathoth SM, Damaschke B, Embs JP, Samwer K
Giant changes in atomic dynamics on microalloying metallic melt
Applied Physics Letters **95**, 191907 (2009)

Chodankar S, Aswal VK, Kohlbrecher J, Vavrin R, Wagh AG
Small-angle neutron scattering study of structure and kinetics of temperature-induced protein gelation
Physical Review E **79**, 021912 (2009)

Christensen M, Johnsen S, Juranyi F, Iversen BB
Clathrate guest atoms under pressure
Journal of Applied Physics **105**, 073508 (2009)

Claesson T, Mansson M, OEnsten A, Shi M, Sassa Y, Pailhes S, Chang J, Bendounan A, Patthey L, Mesot J, Muro T, Matsushita T, Kinoshita T, Nakamura T, Momono N, Oda M, Ido M, Tjernberg O
Electronic structure of La1.48Nd0.4Sr0.12CuO4 probed by high-and low-energy angle-resolved photoelectron spectroscopy
Physical Review B **80**, 094503 (2009)

Cowley RA, Gvasaliya SN, Roessli B
Soft Modes and Relaxor Ferroelectrics
Ferroelectrics **378**, 53 (2009)

Das A, Geue T
Magnetic correlations in Cr-Fe-Mn alloy
Journal of Magnetism And Magnetic Materials **321**, 3637 (2009)

Doebrich F, Elmas M, Ferdinand A, Markmann J, Sharp M, Eckerlebe H, Kohlbrecher J, Birringer R, Michels A
Grain-boundary-induced spin disorder innanocrystalline gadolinium
Journal of Physics-Condensed Matter **21**, 156003 (2009)

Doenni A, Kitazawa H, Keller L, Fischer P, Javorsky P, Fauth F, Zolliker M
Determination of frustrated and non-frustrated magnetic structures of hexagonal and orthorhombic TbPdAl
Journal of Alloys And Compounds **477**, 16 (2009)

Drew AJ, Niedermayer C, Baker PJ, Pratt FL, Blundell SJ, Lancaster T, Liu RH, Wu G, Chen XH, Watanabe I, Malik VK, Dubroka A, Roessle M, Kim KW, Baines C, Bernhard C
Coexistence of static magnetism and superconductivity in SmFeAsO1-xFx as revealed by muon spin rotation
Nature Materials **8**, 310 (2009)

Drokina T, Petrakovskii G, Keller L, Schefer J
Magnetic structure in pyroxene NaFeGe2O6
International Conference on Functional Materials **October 2009**, 15 (2009)

Drokina T, Petrakovskii G, Keller L, Schefer J, Ivanov D
Magnetic structure and properties of pyroxene NaFeGe2O6
Rare Metals **28**, 398 (2009)

Evtushinsky DV, Inosov DS, Zabolotnyy VB, Viazovska MS, Khasanov R, Amato A, Klauss HH, Luetkens H, Niedermayer C, Sun GL, Hinkov V, Lin CT, Varykhalov A, Koitzsch A, Knupfer M, Buchner B, Kordyuk AA, Borisenko SV
Momentum-resolved superconducting gap in the bulk of Ba1-xKxFe2As2 from combined ARPES and mu SR measurements
New Journal of Physics **11**, 055069 (2009)

Fertman E, Beznosov A, Sheptyakov D, Desnenko V, Kajnakova M, Feher A, Khalyavin D
Effect of Y-doping on the magnetic and charge orderings in Nd2/3Ca1/3MnO3
Journal of Magnetism And Magnetic Materials **321**, 316 (2009)

Garcia-Fernandez M, Staub U, Bodenthin Y, Scagnoli V, Pomjakushin V, Lovesey SW, Mirone A, Herrero-Martin J, Piamonteze C, Pomjakushina E
Orbital Order at Mn and O Sites and Absence of Zener Polaron Formation in Manganites
Physical Review Letters **103**, 097205 (2009)

Gasser U
Crystallization in three- and two-dimensional colloidal suspensions
Journal of Physics-Condensed Matter **21**, 203101 (2009)

Gasser U, Sierra-Martin B, Fernandez-Nieves A
Crystal structure of highly concentrated, ionic microgel suspensions studied by neutron scattering
Physical Review E **79**, 051403 (2009)

Glidle A, Hillman AR, Ryder KS, Smith EL, Cooper JM, Dalgliesh R, Cubitt R, Geue TH
Metal chelation and spatial profiling of components in crown ether functionalised conducting copolymer films
Electrochimica Acta **55**, 439 (2009)

Gonzalez Sanchez F, Gimmi TH, Juranyi F, Van Loon L, Diamond LW
Linking the diffusion of water in compacted clays at two different time scales:tracer through-diffusion and quasielastic neutron scattering
Environmental Science & Technology **43**, 3487 (2009)

Hase M, Donni A, Pomjakushin VY, Keller L, Gozzo F, Cervellino A, Kohno M
Magnetic structure of Cu2CdB2O6 exhibiting a quantum-mechanical magnetization plateau and classical antiferromagnetic long-range order
Physical Review B **80**, 104405 (2009)

Haug D, Hinkov V, Suchaneck A, Inosov DS, Christensen NB, Niedermayer CH, Bourges P, Sidis Y, Park JT, Ivanov A, Lin CT, Mesot J, Keimer B
Magnetic-Field-Enhanced Incommensurate Magnetic Order in the Underdoped High-Temperature Superconductor YBa2Cu3O6.45
Physical Review Letters **103**, 017001 (2009)

Holyst R, Bielejewska A, Szymanski J, Wilk A, Patkowski A, Gapinski J, Zywocinski A, Kalwarczyk T, Kalwarczyk E, Tabaka M, Ziebacza N, Wieczoreka SA
Scaling from of viscosity at all lenght-scales in poly(ethylene glycol) solutions studied by fluorescence correlation spectroscopy and capillary electrophoresis
Physical Chemistry Chemical Physics **11**, 9025 (2009)

Hong T, Custelcean R, Sales BC, Roessli B, Singh DK, Zheludev A
Synthesis and structural characterization of 2Dioxane center dot 2H(2)O center dot CuCl2: Metal-organic compound with Heisenberg antiferromagnetic S=1/2 chains
Physical Review B **80**, 132404 (2009)

Hoppler J, Stahn J, Niedermayer C, Malik VK, Bouyanfif H, Drew AJ, Rossle M, Buzdin A, Cristiani G, Habermeier HU, Keimer B, Bernhard C
Giant superconductivity-induced modulation of the ferromagnetic magnetization in a cuprate-manganite superlattice
Nature Materials **8**, 315 (2009)

Hueger E, Schmidt H, Stahn J, Braunschweig B, Geckle U, Bruns M, Markwitz A
Atomic transport in metastable compounds: Case study of self-diffusion in Si-C-N films using neutron reflectometry
Physical Review B **80**, 220101(R) (2009)

Hueger E, Stahn J, Geckle U, Bruns M, Schmidt H
Diffusion in Isotope Heterostructures Investigated by Neutron Reflectometry
Defect And Diffusion Forum **289-292**, 697 (2009)

Ikedo Y, Sugiyama J, Nozaki H, Russo PL, Andreica D, Amato A, Mansson M, Shizuya M, Isobe M, Takayama-Muromachi E
Paramagnetic nature of the layered cobalt dioxide with a double rocksalt-type layer
Physica B-Condensed Matter **404**, 607 (2009)

Isonov DS, Leineweber A, Yang X, Park JT, Christensen NB, Dinnebier R, Sun GL, Niedermayer CH, Haug D, Stephens PW, Stahn J, Khvostikova O, Lin CT, Andersen OK, Keimer B, Hinkov V
Suppression of the structural phase transition and lattice softening in slightly underdoped Ba1-xKxFe2As2 with electronic phase separation
Physical Review B **79**, 224503 (2009)

Ivashkevich LS, Lyakhov AS, Degtyariki MM, Efimov VV, Gaponik PN, Tiutiunnikov SI, Voitekhovich SV, Ivashkevich OA, Yusupov RV, Trots DM, Sikolenko V
Neutron and synchotron x-ray powder study of copper (II) chloride complex with deuterated 1-ethyltetrazole
Zeitschrift Fur Kristallographie **224**, 233 (2009)

Jain A, Yusuf SM, Campo J, Keller L
Magnetic ordering in the spin-chain compounds Ca3Co2-xFexO6 (x = 0.2 and 0.4): A neutron diffraction study
Physical Review B **79**, 184428 (2009)

Jensen TBS, Christensen NB, Kenzelmann M, Ronnow HM, Niedermayer C, Andersen NH, Lefmann K, Jimenez-Ruiz M, Li J, Zarestky JL, Vaknin D
Anomalous spin waves and the commensurate-incommensurate magnetic phase transition in LiNiPO4
Physical Review B **79**, 092413 (2009)

Jensen TBS, Christensen NB, Kenzelmann M, Ronnow HM, Niedermayer C, Andersen NH, Lefmann K, Schefer J, von Zimmermann M, Li J, Zarestky JL, Vaknin D
Field-induced magnetic phases and electric polarization in LiNiPO4
Physical Review B **79**, 092412 (2009)

Kawasaki Y, Minami T, Kishimoto Y, Ohno T, Koda A, Satoh KH, Kadono R, Gavilano JL, Luetkens H, Nakajima T, Ueda Y
Microscopic investigation of antiferromagnetic order in A-site-ordered perovskite manganite YBaMn2O6
Physica B-Condensed Matter **404**, 781 (2009)

Khasanov R, Bendele M, Amato A, Babkevich P, Boothroyd AT, Cervellino A, Conder K, Gvasaliya SN, Keller H, Klauss HH, Luetkens H, Pomjakushin V, Pomjakushina E, Roessli B
Coexistence of incommensurate magnetism and superconductivity in Fe(1+y)SexTe(1-x)
Physical Review B **80**, 140511 (2009)

Khasanov R, Evtushinsky DV, Amato A, Klauss HH, Luetkens H, Niedermayer C, Buchner B, Sun GL, Lin CT, Park JT, Inosov DS, Hinkov V
Two-Gap Superconductivity in Ba1-xKxFe2As2: A Complementary Study of the Magnetic Penetration Depth by Muon-Spin Rotation and Angle-Resolved Photoemission
Physical Review Letters **102**, 187005 (2009)

Kittilstved KR, Aboshyan Sorgho L, Amstutz N, Tregenna-Piggott PLW, Hauser A
Ground-State Electronic Structure of Vanadium(III) Trisoxalate in Hydrated Compounds
Inorganic Chemistry **48**, 7750 (2009)

Klokishner SI, Ostrovsky SM, Reu OS, Palii AV, Tregenna-Piggott PLW, Brock-Nannestad T, Bendix J, Mutka H
Magnetic Anisotropy in the [CuII LTbIII(hfac)2]2 Single Molecule Magnet: Experimental Study and Theoretical Modeling
Journal of Physical Chemistry C **113**, 8573 (2009)

Klotz S, Bove LE, Straessle T, Hansen TC, Saitta AM
The preparation and structure of salty ice VII under pressure
Nature Materials **8**, 405 (2009)

Kolasinska M, Krastev R, Gutberlet T, Warszynski P
Layer-by-Layer Deposition of Polyelectrolytes. Dipping versus Spraying
Langmuir **24**, 1224 (2009)

Kondo T, Khasanov R, Sassa Y, Bendounan A, Pailhes S, Chang J, Mesot J, Keller H, Zhigadlo ND, Shi M, Bukowski Z, Karpinski J, Kaminski A
Anomalous asymmetry in the Fermi surface of the high-temperature superconductor YBa2Cu4O8 revealed by angle-resolved photoemission spectroscopy
Physical Review B **80**, 100505 (2009)

Kraemer KW, Keller L
High Temperature Phase and Thermal Expansion of PrBr3
Zeitschrift Fur Anorganische Und Allgemeine Chemie **635**, 982 (2009)

Krimmel A, Guenther A, Kraetschmer W, Dekinger H, Buettgen N, Eyert V, Loidl A, Sheptyakov DV, Scheidt EW, Scherer W
Intermediate-valence behavior of the transition-metal oxide CaCu3Ru4O12
Physical Review B **80**, 121101 (2009)

Kuzmicheva GM, Zaharko O, Tyunina EA
Point defects in langatate crystals
Crystallography Reports **54**, 279 (2009)

Laver M, Bowell CJ, Forgan EM, Abrahamsen AB, Fort D, Dewhurst CD, Muhlbauer S, Christen DK, Kohlbrecher J, Cubitt R, Ramos S
Structure and degeneracy of vortex lattice domains in pure superconducting niobium: A small-angle neutron scattering study
Physical Review B **79**, 014518 (2009)

Lewis SJ, Hossain S, Booker JD, Truman CE, Stuhr U
Measurement of Torsionally Induced Shear Stresses in Shrink-Fit Assemblies
Experimental Mechanics **49**, 637 (2009)

Lietor-Santos JJ, Sierra-Martin B, Vavrin R, Hu Z, Gasser U
Deswelling Microgel Particles Using Hydrostatic Pressure
Macromolecules **42**, 6225 (2009)

Lister SJ, Wismayer MP, Venkataramana V, de Vries MA, Ray SJ, Lee SL, Thomson T, Kohlbrecher J, Do H, Ikeda Y, Takano K, Dewhurst C
Small-angle polarized neutron studies of perpendicular magnetic recording media
Journal of Applied Physics **106**, 063908 (2009)

Logvinovich D, Bocher L, Sheptyakov D, Figi R, Ebbinghaus SG, Aguiar R, Aguirre MH, Reller A, Weidenkaff A
Microstructure, surface composition and chemical stability of partly ordered LaTiO2N
Solid State Sciences **11**, 1513 (2009)

Maisuradze A, Shengelaya A, Kochelaev BI, Pomjakushina E, Conder K, Keller H, Muller KA
Probing the Yb3+ spin relaxation in Y0.98Yb0.02Ba2Cu3Ox by electron paramagnetic resonance
Physical Review B **79**, 054519 (2009)

Maljuk A, Tsurkan V, Zestrea V, Zaharko O, Cervellino A, Loidl A, Argyriou DN
Floating-zone growth of large high-quality CoAl2O4 single crystals
Journal of Crystal Growth **311**, 3997 (2009)

Martin C, Engelhardt L, Baker ML, Timco GA, Tuna F, Winpenny REP, Tregenna-Piggott PLW, Luban M, Prozorov R
Radio-frequency spectroscopy of the low-energy spectrum of the magnetic molecule Cr12Cu2
Physical Review B **80**, 100407 (2009)

Masuda T, Kakurai K, Zheludev A
Spin dimers in the quantum ferrimagnet Cu2Fe2Ge4O13 under staggered and random magnetic fields
Physical Review B **80**, 180412 (2009)

Michels A, Elmas M, Doebrich F, Ames M, Markmann J, Sharp M, Eckerlebe H, Kohlbrecher J, Birringer R
Porosity-induced spin disorder in nanocrystalline inert-gas-condensed iron
EPL **85**, 47003 (2009)

Park JT, Inosov DS, Niedermayer C, Sun GL, Haug D, Christensen NB, Dinnebier R, Boris AV, Drew AJ, Schulz L, Shapoval T, Wolff U, Neu V, Yang X, Lin CT, Keimer B, Hinkov V
Electronic Phase Separation in the Slightly Underdoped Iron Pnictide Superconductor Ba1-xKxFe2As2
Physical Review Letters **102**, 117006 (2009)

Petrenko VI, Avdeev MV, Almasy L, Bulavin LA, Aksenov VL, Rosta L, Garamus VM
Interaction of mono-carboxylic acids in benzene studied by small-angleneutron scattering
Colloids And Surfaces A-Physicochemical And Engineering Aspects **337**, 91 (2009)

Piegsa FM, van den Brandt B, Hautle P, Kohlbrecher J, Konter JA
Quantitative Radiography of Magnetic Fields Using Neutron Spin Phase Imaging
Physical Review Letters **102**, 145501 (2009)

Pomjakushina E, Conder K, Pomjakushin V, Bendele M, Khasanov R
Synthesis, crystal structure, and chemical stability of the superconductor FeSe1-x
Physical Review B **80**, 024517 (2009)

Pomjakushin VY, Kenzelmann M, Doenni A, Harris AB, Nakajima T, Mitsuda S, Tachibana M, Keller L, Mesot J, Kitazawa H, Takayama-Muromachi E
Evidence for large electric polarization from collinear magnetism in TmMnO3
New Journal of Physics **11**, 043019 (2009)

Pregelj M, Zaharko O, Zorko A, Kutnjak Z, Jeglic P, Brown PJ, Jagodic M, Jaglicic Z, Berger H, Arcon D
Spin Amplitude Modulation Driven Magnetoelectric Coupling in the New Multiferroic FeTe2O5Br
Physical Review Letters **103**, 147202 (2009)

Pregelj M, Zorko A, Zaharko O, Bousier R, Berger H, Katori HA, Arcon D
Magnetic phase diagram of the two-dimensional antiferromagnet Ni5(TeO3)4Br2
Physical Review B **79**, 064407 (2009)

Prester M, Zivkovic I, Zaharko O, Pajic D, Tregenna-Piggott P, Berger H
Ferromagnetism in Co7(TeO3)4Br6: A byproduct of complex antiferromagnetic order and single-ion anisotropy
Physical Review B **79**, 144433 (2009)

Prsa K, Ronnow HM, Zaharko O, Christensen NB, Jensen J, Chang J, Streule S, Jimenez-Ruiz M, Berger H, Prester M, Mesot J
Anomalous Magnetic Excitations of Cooperative Tetrahedral Spin Clusters
Physical Review Letters **102**, 177202 (2009)

Rasch JCE, Boehm M, Ritter C, Mutka H, Schefer J, Keller L, Abramova GM, Cervellino A, Loeffler JF
Magnetoelastic coupling in the triangular lattice antiferromagnet CuCrS2
Physical Review B **80**, 104431 (2009)

Rasch JCE, Sheptyakov DV, Schefer J, Keller L, Boehm M, Gozzo F, Volkov NV, Sablina KA, Petrakovskii GA, Grimmer H, Conder K, Loffler JF
Structural properties of Pb3Mn7O15 determined from high-resolution synchrotron powder diffraction
Journal of Solid State Chemistry **182**, 1188 (2009)

Reinhold B, Geue T, Huber P, Sant T, Pietsch U, Sztucki M
In Situ and Ex Situ SAXS Investigation of Colloidal Sedimentation onto Laterally Patterned Support
Langmuir **25**, 814 (2009)

Remhof A, Łodziana Z, Buchter F, Martelli P, Pendolino F, Friedrichs O, Zuettel A, Embs JP
Rotational Diffusion in NaBH4
Journal of Physical Chemistry C **113**, 16834 (2009)

Riley MJ, Noble CJ, Tregenna-Piggott PLW
The dynamic Jahn-Teller effect in Cu(II) doped MgO
Journal of Chemical Physics **130**, 104708 (2009)

Rotaru GM, Roessli B, Amato A, Gvasaliya SN, Mudry C, Lushnikov SG, Shaplygina TA
Spin-glass state and long-range magnetic order in Pb(Fe1/2Nb1/2)O-3 seen via neutron scattering and muon spin rotation
Physical Review B **79**, 184430 (2009)

Sanina VA, Golovenchitis EI, Zalesskii VG, Lushnikov SG, Scheglov MP, Gvasaliya SN, Savvinov A, Katiyar RS, Kawaji H, Atake T
Phase separation and charge carrier self-organization in semiconductor-multiferroic Eu0.8Ce0.2Mn2O5
Physical Review B **80**, 224401 (2009)

Savii C, Almasy L, Ionescu C, Szekely NK, Enache C, Popovici M, Sora I, Nicoara D, Savii GD, Resiga DS, Subrt J, Stengl V
Mesoporous silica matrices derived from sol-gel process assisted by low power ultrasonic activation
Processing And Applications of Ceramics **3**, 59 (2009)

Sazonov AP, Troyanchuk IO, Gamari-Seale H, Sikolenko VV, Stefanopoulos KL, Nicolaides GK6, Atanassova YK
Neutron diffraction study and magnetic properties of La1-xBsxCoO3 (x=0.2 and =0.3)
Journal of Physics-Condensed Matter **21**, 156004 (2009)

Schilling A, Dell'Amore R, Karpinski J, Bukowski Z, Medarde M, Pomjakushina E, Muller KA
LaBaNiO4: a Fermi glass
Journal of Physics-Condensed Matter **21**, 015701 (2009)

Schlappa J, Schmitt T, Vernay F, Strocov VN, Ilakovac V, Thielemann B, Ronnow HM, Vanishri S, Piazzalunga A, Wang X, Braicovich L, Ghiringhelli G, Marin C, Mesot J, Delley B, Patthey L
Collective Magnetic Excitations in the Spin Ladder Sr14Cu24O41 Measured Using High-Resolution Resonant Inelastic X-Ray Scattering
Physical Review Letters **103**, 047401 (2009)

Schmidt H, Hueger E, Chakravarty S, Gutberlet T, Stahn J, Tietze U, Lott D
Neutron Reflectometry - A Tool to Investigate Diffusion on the Nano-scale
Advanced Engineering Materials **11**, 446 (2009)

Schneider M, Stahn J, Boeni P
Focusing of cold neutrons: Performance of a laterally graded and parabolically bent multilayer
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **A 610**, 530 (2009)

Schumacher M, Ruppel M, Kohlbrecher J, Burkhardt M, Plamper F, Drechsler M, Mueller AHE
Smart organic-inorganic nanohybrid stars based on star-shaped poly(acrylic acid) and functional silsesquioxane nanoparticles
Polymer **50**, 1908 (2009)

Sheptyakov DV, Pomjakushin VY, Drozhzhin OA, Istomin SY, Antipov EV, Bobrikov IA, Balagurov AM
Correlation of chemical coordination and magnetic ordering in Sr3YCo4O10.5+delta (delta=0.02 and 0.26)
Physical Review B **80**, 024409 (2009)

Shi M, Bendounan A, Razzoli E, Rosenkranz S, Norman MR, Campuzano JC, Chang J, Mansson M, Sassa Y, Claesson T, Tjernberg O, Patthey L, Momono N, Oda M, Ido M, Guerrero S, Mudry C, Mesot J
Spectroscopic evidence for preformed Cooper pairs in the pseudogap phase of cuprates
EPL **88**, 27008 (2009)

Sikolenko V, Efimov V, Efimova E, Sazonov A, Ritter C, Kuzmin A, Troyanchuk I
Neutron diffraction studies of structural and magnetic properties of niobium doped cobaltites
Journal of Physics-Condensed Matter **21**, 436002 (2009)

Stadler AM, Digel I, Embs JP, Unruh T, Tehei M, Zaccai G, Buldt G, Artmann GM
From Powder to Solution: Hydration Dependence of Human Hemoglobin Dynamics Correlated to Body Temperature
Biophysical Journal **96**, 5073 (2009)

Stahn J, Niedermayer CH, Hoppler J, Bernhard C
PNR Studies of Proximity and Coupling Effects in YBa2Cu3O7/La2/3Ca1/3MnO3 Superlattices
Neutron News **20 (3)**, 13 (2009)

Sugiyama J, Ikedo Y, ofer O, Mansson M, Ansaldo EJ, Brewer JH, Chow KH, Sakurai H, Takayama-Muromachi E
Comparative Muon-Spin Rotation and Relaxation Study on the Zigzag Chain Compounds NaMn2O4 and Li0:92Mn2O4
Journal of The Physical Society of Japan **78**, 084715 (2009)

Sugiyama J, Mansson M, Ikedo Y, Goko T, Mukai K, Andreica D, Amato A, Ariyoshi K, Ohzuku T
mu+SR investigation of local magnetic order in LiCrO2
Physical Review B **79**, 184411 (2009)

Sugiyama J, Mukai K, Ikedo Y, Nozaki H, Mansson M, Watanabe I
Li Diffusion in LixCoO2 Probed by Muon-Spin Spectroscopy
Physical Review Letters **103**, 147601 (2009)

Thielemann B, Ruegg C, Kiefer K, Ronnow HM, Normand B, Bouillot P, Kollath C, Orignac E, Citro R, Giamarchi T, Lauchli AM, Biner D, Kramer KW, Wolff-Fabris F, Zapf VS, Jaime M, Stahn J, Christensen NB, Grenier B, McMorrow DF, Mesot J
Field-controlled magnetic order in the quantum spin-ladder system (Hpip)(2)CuBr4
Physical Review B **79**, 020408 (2009)

Thielemann B, Ruegg C, Kiefer K, Ronnow HM, Normand B, Bouillot P, Kollath C, Orignac E, Citro R, Giamarchi T, Lauchli AM, Biner D, Kramer KW, Wolff-Fabris F, Zapf VS, Jaime M, Stahn J, Christensen NB, Grenier B, McMorrow DF, Mesot J
Field-controlled magnetic order in the quantum spin-ladder system (Hpip)(2)CuBr4
Physical Review B **79**, 020408 (2009)

Thielemann B, Ruegg C, Ronnow HM, Laeuchli AM, Caux JS, Normand B, Biner D, Kraemer KW, Guedel HU, Stahn J, Habicht K, Kiefer K, Boehm M, Mcmorrow DF, Mesot J
Direct Observation of Magnon Fractionalization in the Quantum Spin Ladder
Physical Review Letters **102**, 107204 (2009)

Thilly L, Scheuerlein C, Stuhr U, Bordini B, Seeber B
Residual Strain in a Nb3Sn Strand Mounted on a Barrel for Critical Current Measurements
IEEE Transactions on Applied Superconductivity **19**, 3 (2009)

Tregenna-Piggott PW, Sheptyakov D, Keller L, Klokishner SI, Ostrovsky SM, Palii AV, Reu OS, Bendix J, Brock-Nannestad T, Pedersen K, Weihe H, Mutka H
Single-Ion Anisotropy and Exchange Interactions in the Cyano-Bridged Trimers MnIII2MIII(CN)6 (MIII = Co, Cr, Fe) Species Incorporating[Mn(5-Brsalen)]+ Units: An Inelastic Neutron Scattering and Magnetic Susceptibility Study
Inorganic Chemistry **48**, 128 (2009)

Troyanchuk IO, Karpinsky DV, Sazonov AP, Sikolenko V, Efimov V, Senyshyn A
Effect of iron doping on magnetic properties of Sr0.78Y0.22CoO2.625+y-layered perovskite
Journal of Materials Science **44**, 5900 (2009)

Tsyrulin N, Pardini T, Singh RRP, Xiao F, Link P, Schneidewind A, Hiess A, Landee CP, Turnbull MM, Kenzelmann M
Quantum Effects in a Weakly Frustrated S=1/2 Two-Dimensional Heisenberg Antiferromagnet in an Applied Magnetic Field
Physical Review Letters **102**, 197201 (2009)

Tumanjong Azuah R, Kneller LR, Qiu Y, Brown CM, Copley JRD, Dimeo RM, Tregenna-Piggott PLW
DAVE: A Comprehensive Software Suite of the Reduction, Visulization, and Analysis of Low Energy Neutron Spectroscopic Data
Journal of Research of The National Institute of Standards And Technology **114**, 341 (2009)

Udby L, Andersen NH, Chou FC, Christensen NB, Emery SB, Lefmann K, Lynn JW, Mohottala HE, Niedermayer C, Wells BO
Magnetic ordering in electronically phase-separated La2-xSrxCuO4+y: Neutron diffraction experiments
Physical Review B **80**, 014505 (2009)

Vavrin R, Kohlbrecher J, Wilk A, Ratajczyk M, Lettinga MP, Buitenhuis J, Meier G
Structure and phase diagram of an adhesive colloidal dispersion under high pressure: A small angle neutron scattering, diffusing wave spectroscopy, and light scattering study
Journal of Chemical Physics **130**, 154903 (2009)

Vidal V, Thilly L, Van Petegem S, Stuhr U, Lecouturier F, Renault PO, Van Swygenhoven H
Plasticity of nanostructured Cu-Nb-based wires: Strengthening mechanisms revealed by in situ deformation under neutrons
Scripta Materialia **60**, 171 (2009)

White JS, Hinkov V, Heslop RW, Lycett RJ, Forgan EM, Bowell C, Straessle S, Abrahamsen AB, Laver M, Dewhurst CD, Kohlbrecher J, Gavilano JL, Mesot J, Keimer B, Erb A
Fermi Surface and Order Parameter Driven Vortex Lattice Structure Transitions in Twin-Free YBa2Cu3O7
Physical Review Letters **102**, 097001 (2009)

Wiedenmann A, Gaehler R, May R, Keiderling U, Habicht K, Prevost S, Klokkenburg M, Erne B, Kohlbrecher J
Stroboscopic Small Angle Neutron Scattering Investigations of Microsecond Dynamics in Magnetic Nanomaterials
Chapter 9 in Studying Kinetics With Neutrons, Editors: G. Eckold, H. Schober and S.E. Nagler, Springer **161**, 241 (2009)

Yan X, Grytsiv A, Rogl A, Pomjakushin V, Xue X
On the crystal structure of the Mn-Ni-SiG-phase
Journal of Alloys And Compounds **469**, 152 (2009)

Zheludev A, Garlea VO, Tsvelik A, Regnault LP, Habicht K, Kiefer K, Roessli B
Excitations from a chiral magnetized state of a frustrated quantum spin liquid
Physical Review B **80**, 214413 (2009)

INVITED TALKS

R. Ackermann, U. Filges, M. Schneider, L. Holitzner, J. Stahn, Th. Straessle, J. P. Embs, R. Hempelmann
Ray-trace MC simulations and experiments on a wide-angle polarizing analyzer for the TOF spectrometer FOCUS
QENS 2009, PSI, Villigen, Swizerland, February 10, 2009

L.Almasy
Structural characterisation of small magnetic nanoparticles
The Final Workshop COST 539 ELENA Aveiro, Portugal, Oct. 28-30, 2009

M. Böhm, J.C.E. Rasch, J. Schefer, H. Mutka, C. Ritter, G. Abramova, I Vasilyeva
Spin-lattice coupling in $CuCrS_2$ probed by inelastic neutron diffraction
Österreichische und Schweizerische Physikalische Gesellschaft, Gemeinsame Jahrestagung, Innsbruck, Austria, Innsbruck, Austria, September 2-4, 2009

N.B. Christensen
Superconductivity, from quantum physics to applications
Conference on the European Spallation Source Scandinavia, Copenhagen, Denmark, March 25, 2009

T. Drokina, G. Petrakovskii, L. Keller, J. Schefer
Magnetic Structure in Pyroxene $NaFeGe_2O_6$
International Conference on Functional Materials, ICFM 2009, Crimea, Ukraine, October 5-10, 2009

J.P. Embs
Cation Dynamics in ILs as seen by QuasiElastic Neutron Scattering (QENS)
DFG SPP Colloquium Bamberg (March 2009)

J.P.Embs
Cation Dynamics in ILs
Theoretical Chemistry Colloquium (Mai 2009, U Leipzig)

J.P. Embs
QENS -- QuasiElastic Neutron Scattering on RTILs
Workshop Dynamics on Ionic Liquids (Sept 2009, U Leipzig)

J.P.Embs
Dynamical Processes in ILs on ps--time scale as seen by QENS
DFG SPP Colloquium Potsdam (Nov 2009, Potsdam)

U. Gasser
Non-Central Forces in Crystals of Charged Colloids, Conference Frontiers of Soft Condensed Matter
Les Houches, France, February, 15-20, 2009

J. L. Gavilano
Small-Angle Neutron Scattering Studies of Unconventional Superconductors
Condensed matter seminar Zurich, Switzerland, December 9, 2009

Th. Geue, P. Huber, M. Textor, Th. Blaettler
Grazing incidence small angle X-ray scattering on ordered colloidal assemblies
Mat Sci Coll. ETHZ, Zurich, Switzerland, November 4, 2009

Th. Geue, P. Huber, M. Textor, Th. Blaettler
Grazing Incidence Small Angle X-ray Scattering Data and Simulations of Colloidal Multilayers
GISAS Satellite Conference, Hamburg, Germany, September 21, 2009

S.N.Gvasaliya
Neutron Quasi-Elastic Scattering in Relaxor Ferroelectrics
QENS 2009, PSI, Villigen, Swizerland, February 10, 2009

F. Juranyi
Water diffusion in clays at different scales
Neutron scattering school in Mumbai, Mumbai, India, October 10 2009

F. Juranyi
Diffusion of confined water
Conference on Neutron Scattering and Mesoscopic Systems, Goa , India, October, 12-14, 2009

J. Kohlbrecher
Structure and phase diagram of an adhesive colloidal dispersion under high pressure
XIV International Conference on Small-Angle Scattering, Oxford, U.K., September 13-18, 2009

J. Kohlbrecher
Structure and phase diagram of an adhesive colloidal dispersion under high pressure
14th Seminar on Neutron Scattering Investigation in Condensed Matter, Poznan, Poland, May 14-16, 2009

C. Kraemer
Quantum Phase Transition in a Magnetic Model System
Annual meeting of the Swiss Physical Society, Karlsruhe, Germany, July 26.-31, 2009

C.Kraemer
Quantum Phase Transition in a Magnetic Model System
EU round table Knoxville, USA, May 3.-7. 2009

M. Laver
Small angle neutron scattering studies of the flux line lattice in superconducting niobium
Seminar, Paul Scherrer Institut, Villigen PSI, Switzerland, May 15 2009

M. Laver
Magnetostriction in FeGa alloys: magnetic inhomogeneities unveiled by SANS
International Conference on Neutron Scattering, ICNS 2009, Knoxville, Tennessee, USA, May. 4-8, 2009

M. Laver
Small angle neutron scattering studies of the flux line lattice
Seminar at University of Maryland, Washington D.C., USA , March 26, 2009

M. Laver
Unraveling the magnetostriction in Galfenol: Neutron scattering explorations
Materials Research Society, fall meeting, Boston, USA , November 30 - December 4, 2009

L. Le Dréau, W. Paulus, J. Schefer, O. Hernandez, G. Vaughan, S. Hosoya.
Oxygen diffusion in highly ordered framework: the case of La_2CoO_{4+x}
2009 International symposium on crystal science and technologies Kofu, Japan, December 4-5, 2009

L. Le Dréau, W. Paulus, J. Schefer, K Conder
Oxygen diffusion at moderate temperatures monitored by structural modulation in La_2CoO_{4+d}
ESM Status Report, Zürich, Switzerland, June 8, 2009

St.J.S. Lister, V. Venkataramana, M. A de Vries, St. L Lee, T. Thomson, J. Kohlbrecher
Polarised small-angle neutron scattering study of the switching response of perpendicular magnetic recording media
XIV International Conference on Small-Angle Scattering, Oxford, U.K., September 13-18, 2009

M. Månsson, Y. Ikedo, T. Goko, J. Sugiyama, K. Mukai, D. Andreica, A. Amato, K. Ariyoshi, T. Ohzuku
muSR Investigation of Local Magnetic Order in $LiCrO_2$
The International Conference on Magnetism, ICM 2009, Karlsruhe, Germany, July 26-31, 2009

M. Månsson, J. Sugiyama, B. Roessli
muSR & Automobiles part II
Spectroscopy of Novel Materials workshop, Rigi, Switzerland, January 17-21, 2009

Ch. Niedermayer
Applications of neutron scattering techniques in condensed matter research
Norman Hascoe Distinguished Lecture Series University of Connecticut, USA, October12, 2009

Ch. Niedermayer
What can muons tell us about condensed matter?
Norman Hascoe Distinguished Lecture Series , University of Connecticut, USA, October 5, 2009

H. Nozaki, M. Harada, J. Sugiyama, H. Sakurai, M. Månsson, V. Pomjakushin, B. Roessli
Magnetic structure of a zigzag chain compound, NaV_2O_4
The 64th Annual Meeting of the Physical Society of Japan, Tokyo, Japan, March 27-30, 2009

H. Ohta, Martin Månsson, Yutaka Ikedo, Jun Sugiyama, Chishiro Michioka, Kazuyoshi Yoshimura, Jess H. Brewer, Eduardo J. Ansaldo, Scott L. Stubbs, Kim H. Chow, James S. Lord
*Microscopic Magnetic Nature of Water Absorbed Na0.35*CoO_2 *Investigated by NMR, NQR and muSR*
9th International Conference on Materials and Mechanisms of Superconductivity - M2S-IX, Tokyo, Japan, September 7-12, 2009

B. Padmanabhan
Single-crystal neutron diffraction studies up to 5 GPa on multiferroic $Ni_3V_2O_8$
Summerschool on Condesed Matter Research, Zuoz, Switzerland, August 1-7, 2009

V. Pomjakushin
High Resolution Powder Diffractometer for Thermal Neutrons,
Large Facilities for Crystallography Studies: Synchrotron and Neutron sources, October 19th, 2009, Villigen PSI, Switzerland, October 19, 2009

J.C.E. Rasch, M. Boehm, J. Schefer, L. Keller, H. Mutka, C. Ritter, G.M. Abramova, I.G. Vasilyeva
Spin-lattice coupling in $CuCrS_2$ *probed by inelastic neutron scattering*
Annual Meeting of the DPG, Berlin, Germany, March 22-27, 2009

J.C.E. Rasch, M. Boehm, J. Schefer, L. Keller, H. Mutka, C. Ritter, G.M. Abramova, I.G. Vasilyeva
Spin Dynamics and Magnetoelastic Coupling in Triangular Lattice Antiferromagnet $CuCrS_2$
International Conference on Neutron Scattering, ICNS 2009, Knoxville, Tennessee, USA, May 4-7, 2009

G.M.Rotaru, B. Padmanabhan, S.N. Gvasaliya, B. Roessli, Th. Straessle, R.A. Cowley, S.G. Lushnikov S. Klotz
Diffuse Scattering Study Under High Hydrostatic Pressure in $PbMg_{1}/_{3}Nb_{2}/_{3}O_{3}$
ICNS-2009, Knoxville, Tennessee, USA May 4 - 7, 2009

Y.Sassa, M. Radovic, M. Månsson, X. Cui, S. Pailhès, M. Shi, F. Miletto, L. Patthey, J. Mesot
First ARPES results on $YBa_2Cu_3O_{7-x}$ *films grown by PLD*
Spectroscopy of Novel Materials workshop, Rigi, Switzerland, January 17-21, 2009

Y.Sassa, M. Radovic, M. Månsson, X. Cui, S. Pailhès, M. Shi, F. Miletto, L. Patthey, J. Mesot
Surface Reconstruction and Band Folding in Underdoped $YBa_2Cu_3O_7$*-x Films MaNEP*
Martin Peter Colloquium, Geneva, Switzerland, June 19, 2009

Y.Sassa, M. Radovic, M. Månsson, X. Cui, S. Pailhès, M. Shi, F. Miletto, L. Patthey, J. Mesot
Surface Reconstruction and Band Folding in Underdoped $YBa_2Cu_3O_{7-x}$ *Films*
Joint Users' Meeting PSI - JUM@P '09, Villigen PSI, Switzerland, October 12-13, 2009

Y.Sassa, M. Radovic, M. Månsson, X. Cui, S. Pailhès, M. Shi, F. Miletto, L. Patthey, J. Mesot
Surface Reconstruction and Band Folding in Underdoped $YBa_2Cu_3O_7$*-x Films*
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy - CORPES09, Zürich, Switzerland, July 19-24, 2009

Y.Sassa, M. Radovic, M. Månsson, X. Cui, S. Pailhès, M. Shi, F. Miletto, L. Patthey, J. Mesot
Surface reconstruction and band folding in uderdoped $YBa_2Cu_3O_{7-x}$ *films*
EMPA-Phd Symposium, EMPA Dubendorf, Switzerland, November 19, 2009

Y.Sassa, M. Radovic, M. Månsson, X. Cui, S. Pailhès, M. Shi, F. Miletto, L. Patthey, J. Mesot
Surface reconstruction and band folding in uderdoped $YBa_2Cu_3O_{7-x}$ *films*
JUM@P 2009 PSI Villigen, Switzerland, September 12-13, 2009

J. Schefer and St. Janssen
User Facilities at the Paul Scherrer Institute Villigen, Switzerland
Österreichische und Schweizerische Physikalische Gesellschaft, Gemeinsame Jahrestagung, September 2-4, Innsbruck, Austria, 2009

M.Schneider
High Performance Supermirrors on Metallic Substrates
NDS workshop, ILL Grenoble, July 1.-3. 2009

D. Sheptyakov
Introduction to Powder Diffraction Techniques 8th PSI Summer School on Condensed Matter Research
Zuoz, Switzerland, August 1-7, 2009

V.Sikolenko
Cobalt spin state in cobaltites with perovskite structure PNPI
Winter School on Condenced Matter Physics St. Petersburg, Russia, March 8-12, 2009

J. Stahn, J. Hoppler, C. Niedermayer, C. Bernhard
Superconductivity-induced magnetic modulation in adjacent ferromagnetic layers
PNXSM 2009, Bonn, Germany, August 2-5, 2009

J. Stahn, J. Hoppler, C. Niedermayer, C. Bernhard
About the Competition of Superconductivity and Ferromagnetism in Multilayers FOxE
2009 Sorrento, Italy, March 25-27, 2009

J. Stahn
Giant superconductivity-induced modulation of the ferromagnetic magnetization in a cuprate-manganite superlattice
SLS symposium, Villigen PSI, Switzerland, June 2, 2009

Th. Strässle
Single-crystal neutron diffraction studies up to 5 GPa on multiferroic Ni3V2O8
International Conference on High Pressure Science and Technology, Joint AIRAPT-22 & HPCJ-50, Tokyo, Japan, July 26-31, 2009

J. Sugiyama, Y. Ikedo, T. Goko, K. Mukai, M. Månsson, D. Andreica, A. Amato
muSR study of two-dimensional triangular antiferromagnet, $LiCrO_2$
The 64th Autumn Meeting of the Physical Society of Japan, Kumamoto, Japan, September 25-28, 2009

J. Sugiyama, Y. Ikedo, T. Noritake, S. Towata, T. Goko, O. ofer, M. Månsson, E.J. Ansaldo, J.H. Brewer, K.H. Chow
Microscopic indicator for thermodynamic stability of hydrogen storage materials provided by muon-spin spectroscopy
Advanced Science Research , Symposium 2009, ASR2009, Techno Community Square Ricotti, Tokai, Japan, November 10-12, 2009

J. Sugiyama, K. Mukai, Y. Ikedo, H. Nozaki, M. Månsson, I.Watanabe
A novel tool for detecting Li diffusion in solids containing magnetic ions: muSR study on $LixCoO_2$
Advanced Science Research Symposium 2009 ASR2009, Techno Community Square Ricotti, Tokai, Japan, November 10-12, 2009

J. Sugiyama, K. Mukai, Y. Ikedo, H. Nozaki, I. Watanabe, M.Månsson
muSR study of cobalt oxides XXVI: solid state Li diffusion in $LixCoO_2$
The 64th Autumn Meeting of the Physical Society of Japan, Kumamoto, Japan
September 25-28, 2009

J. Sugiyama, K. Mukai, Y. Ikedo, H. Nozaki, I. Watanabe, M. Månsson
Solid state diffusion detected by muSR: LixCoO_2
The 35th Symposium on Solid State Ionics

N. Tsyrulin
Quantum two-dimensional weakly-frustrated S=1/2 antiferromagnet on a square lattice in zero and applied magnetic fields SLS Symposium on Quantum Magnetism
Villigen PSI, Switzerland, August 4, 2009

N. Tsyrulin
Quantum two-dimensional weakly frustrated S=1/2 antiferromagnet on a square lattice in zero and applied fields
International Conference on Magnetism, ICM 2009, Karlsruhe, Germany, July 26-31, 2009

N. Tsyrulin
Magnetic excitation spectra of two-dimensional weakly-frustrated S=1/2 antiferromagnet on a square lattice $Cu(pz)_2(C1O_4)_2$
FRM2 User Meeting Garching, Germany, May 25, 2009

J. White
Pauli paramagnetic effects on the flux line lattice of $CeCoIn_5$
CMMP 2009 Warwick, U.K., December 15-17, 2009

A. Wilk
Thermal gelation in the crowded solution of stars
14th Seminar on Neutron Scattering Investigation in Condensed Matter
Poznan, Poland, May 14-16, 2009

O. Zaharko
Combining dn and d0 ions in frustrated low-dimensional magnetic arrangements
SLS symposium 'Multiferroics, Villigen PSI, Switzerland, December 2, 2009

O.Zaharko
FeTe2O5Br system: a new ferroelectric with a spin amplitude modulation
Polarized neutrons and synchrotron x-rays for magnetism 2009 Bonn

A. Zheludev
Bosonic quasiparticles in quantum spin ladders
Seminar TU Munich, Munich, Germany, November 9, 2009

A. Zheludev
Bosons, Condensation and Glass in quantum spin ladders SPG/OPG
Annual meeting, Innsbruck, Austria, September 4, 2009

A. Zheludev
Magnetism of non-magnetic quantum magnets
Colloquium MP, Stuttgart, Germany, October 27, 2009

A. Zheludev
A spin liquid-to-helimagnet quantum phase transition
Joint Users' Meeting at PSI - JUM@P '09, Villigen PSI, Switzerland, October 12, 2009

A. Zheludev
Magnetism of non-magnetic quantum magnets
Colloquium EPFL, Lausanne, Switzerland, December 7, 2009

CONFERENCE, WORKSHOP AND SEMINAR CONTRIBUTIONS

S. Balog, U. Gasser, K. Mortensen, L. Gubler, H. Ben youcef, G. G. Scherer
Correlation between morphology, water uptake, and proton conductivity in radiation grafted proton exchange membrane
Joint Users' Meeting at PSI - JUM@P '09, Villigen PSI, Switzerland, October 12-13, 2009

N. Egetenmeyer
muSR studies under pressure of the heavy-fermion $CeRhSi_3$
Joint Users' Meeting at PSI.- JUM@P '09, Villigen PSI, Switzerland, October 12-13, 2009

S. Gerber, N. Egetenmeyer, J.L. Gavilano, Th. Strässle, A.D. Bianchi, E. Ressouche, R. Movshovich, E.D. Bauer, J.L. Sarrao, J.D. Thompson, M. Kenzelmann
Evidence for nesting in the superconducting Q phase of $CeCoIn_5$
Joint Users' Meeting at PSI - JUM@P '09, Villigen PSI, Switzerland, October 12-13, 2009

S. Gerber, N. Egetenmeyer, J.L. Gavilano, Th. Strässle, A.D. Bianchi, E. Ressouche, R. Movshovich, E.D. Bauer, J.L. Sarrao, J.D. Thompson, M. Kenzelmann
Evidence for nesting in the superconducting Q phase of $CeCoIn_5$ 2009
Swiss Workshop on Materials With Novel Electronic Properties, Les Diablerets, Switzerland, August 26-28, 2009

S.N. Gvasaliya
Neutron Quasi-Elastic Scattering in Relaxor Ferroelectrics
9th International Conference on Quasielastic Neutron Scattering - QENS2009, Villigen PSI, Switzerland, February 10-13, 2009

P. Huber, O. Bunk, M. Textor, U. Pietsch, T.M. Geue
Grazing Incidence Small Angle X-ray Scattering on Ordered Colloidal Assemblies
Material Science Colloquium of ETH Zurich , Zürich, Switzerland, November 4, 2009

P. Huber, O. Bunk, M. Textor, U. Pietsch, T.M. Geue
Grazing Incidence Small Angle X-ray Scattering Data and Simulations of Colloidal Multilayer
GISAS Satellite Conference , Hamburg, Germany, September 20-23, 2009

P. Huber, O. Bunk, M. Textor, U. Pietsch, T.M. Geue
Grazing Incidence Small Angle X-ray Scattering on Colloidal Multilayers
Joint Users' Meeting at PSI - JUM@P '09 ,
Villigen PSI, Switzerland, October 13, 2009

Y. Ikedo, O. ofer, M. Månsson, J. Sugiyama, J.H. Brewer, E.J. Ansaldo, K.H. Chow, H. Sakurai, E. Takayama-Muromachi
Comparative Muon-Spin Rotation and Relaxation Study on the Zigzag Chain Compounds $NaMn_2O_4$ and $LiMn_2O_4$
The International Conference on Magnetism – ICM 2009, Karlsruhe, Germany, July 26-31, 2009

Y. Ikedo, J. Sugiyama, O. ofer, M. Månsson, H. Sakurai, E. Takayama-Muromachi, E.J. Ansaldo, J.H. Brewer, K.H. Chow
Comparative muSR study on the quasi-one-dimensional compounds $NaMn_2O_4$ and $Li_{0.92}Mn_2O_4$
Advanced Science Research Symposium 2009 – ASR2009, Techno Community Square Ricotti, Tokai, Japan, November 10-12, 2009

Y. Ikedo, J. Sugiyama, K. Mukai, M. Månsson, T. Goko, D. Andreica, A. Amato
muSR study on triangular antiferromagnet $LiCrO_2$
Advanced Science Research Symposium 2009 – ASR2009 , Techno Community Square Ricotti, Tokai, Japan, November 10-12, 2009

Y. Ikedo, K. Kamazawa, H. Nozaki, M. Månsson, F. Juranyi, J. Sugiyama, and Y. Matsuo
Proton diffusion in $Cs_3H(SO_4)_2$
9th International Conference on Quasielastic Neutron Scattering - QENS2009, Villigen PSI, Switzerland, February 10-13, 2009

F. Juranyi
Diffusion of confined water
Annual meeting of the Swiss Physical Society, Zurich.

K. Kamazawa, H. Nozaki, M. Månsson, B. Roessli, H. Fischer, T. C. Hansen, J. Sugyama
Neutron diffraction study of two-dimensional triangular antiferoomagnet, Ag_2MnO_2
The 64th Annual Meeting of the Physical Society of Japan, Tokyo, Japan, March 27-30, 2009

L. Keller, F. Juranyi, K. Conder
Crystal-Field Excitations in the Rare-Earth Palladium Bronzes RPd_3S_4 *(R = Ce, Nd, Dy, Ho)*
International Conference on Magnetism, ICM 2009, Karlsruhe, Germany, July 26-31, 2009

C. Kraemer
Quantum Phase Transition in a Magnetic Model System EU round table
Knoxville, Tennessee, USA, May 3.-7. 2009

G. Krexner and J. Schefer,
Molecular orientations in low-temperature phases of C60
Österreichische und Schweizerische Physikalische Gesellschaft, Gemeinsame Jahrestagung, September 2-4, Innsbruck, Austria, Innsbruck, Austria, September 2-4, 2009

L. Le Dréau, W. Paulus, J. Schefer, O. Hernandez, C. Prestipino, G. Vaughan and S. Hosoya
Oxygen diffusion at moderate temperatures monitored by structural modulation in La_2CoO_{4+d}
Swiss Workshop on Materials with Novel Electronic Properties. Les Diablerets, Switzerland, August 26-28, 2009

L. Le Dréau, W. Paulus, J. Schefer, K Conder
Oxygen diffusion at moderate temperatures monitored by structural modulation in La_2CoO_{4+d}
ESM Status Report , Zürich, Switzerland, June 8, 2009

L. Le Dréau, W. Paulus, J. Schefer, K Conder
Oxygen diffusion at moderate temperatures monitored by structural modulation in La_2CoO_{4+d}
MaNEP Swiss Workshop Meeting , Les Diablerets, Switzerland, August 26-28, 2009

L. Le Dréau, W. Paulus, J. Schefer, K Conder
Oxygen diffusion in highly ordered frameworks : the case of La_2CoO_{4+d}
Annual Meeting of the Swiss Crystallographic Society , Fribourg, Switzerland, September 8, 2009

M. Månsson, Y. Ikedo, T. Goko, J. Sugiyama, K. Mukai, D. Andreica, A. Amato, K. Ariyoshi, T. Ohzuku
muSR Investigation of Local Magnetic Order in LiCrO2
Joint Users' Meeting at PSI - JUM@P '09, Villigen PSI, Switzerland, October 12-13, 2009

M. Månsson, Y. Ikedo, K. Kamazawa, J. Sugiyama, O. ofer, J.H. Brewer, E.J. Ansaldo, V. Sikolenko, V. Pomjakushin, B. Roessli, K.H. Chow, H. Sakurai, E. Takayama-Muromachi
Magnetic Order in the Zigzag Chain Compounds $NaMn_2O_4$ *and* $LiMn_2O_4$
Joint Users' Meeting at PSI - JUM@P '09 Villigen PSI, Switzerland, October 12-13, 2009

M. Månsson, Y. Ikedo, H. Nozaki, J. Sugiyama, P.L. Russo, D. Andreica, M. Shizuya, M. Isobe, E. Takayama-Muromachi
The mu-OH bond in Misfit-layered Cobalt Dioxide $[Ca_{0.85}OH]_{1.16}^{RS}[CoO_2]$
The International Conference on Magnetism - ICM 2009, Karlsruhe, Germany, July 26-31, 2009

M. Månsson, Y. Ikedo, H. Nozaki, J. Sugiyama, P.L. Russo, D. Andreica, M. Shizuya, M. Isobe, E. Takayama-Muromachi
The mu-OH bond in Misfit-layered Cobalt Dioxide $[Ca_{0.85}OH]_{1.16}{}^{RS}[CoO_2]$
Joint Users' Meeting at PSI - JUM@P '09 , Villigen PSI, Switzerland, October 12-13, 2009

M. Månsson, H. Nozaki, M. Harada, V. Pomjakushin, V. Sikolenko, A. Cervellino, J. Sugiyama, B. Roessli, H. Sakurai
Incommensurate Spin Density Wave Order in the Metallic Antiferromagnet NaV_2O_4
Joint Users' Meeting at PSI - JUM@P '09 , Villigen PSI, Switzerland, October 12-13, 2009

M. Månsson, T. Claesson, Y. Sassa, A. Önsten, M. Shi, S. Pailhés, J. Chang, A. Bendounan, L. Patthey, J. Mesot, T. Muro, T. Matsushita, T. Kinoshita, T. Nakamura, N. Momono, M. Oda, M. Ido, and O. Tjernberg
Electronic Structure of $La_{1.48}Nd_{0.4}Sr_{0.12}CuO_4$ *Probed by High- & Low-energy Angle-resolved Photoelectron Spectroscopy*
Joint Users' Meeting at PSI - JUM@P '09 , Villigen PSI , Switzerland , October 12-13, 2009

M. Marko, G. Krexner, J. Schefer, G. Török
Neutron holography using multidetectors,
Österreichische und Schweizerische Physikalische Gesellschaft, Gemeinsame Jahrestagung, September 2-4, Innsbruck, Austria, Innsbruck , Austria , September 2-4, 2009

H. Nozaki, M. Månsson, M. Harada, V. Pomjakushin, A. Cervellino, J. Sugiyama, B. Roessli, H. Sakurai
Incommensurate Spin Density Wave Order in the Metallic Antiferromagnet NaV_2O_4
The International Conference on Magnetism - ICM 2009, Karlsruhe, Germany, July 26-31, 2009

M. Radovic, Y. Sassa, M. Månsson, Ph. Willmott, X. Cui, St. Pailhés, M. Shi, F. M. Granozio, J. Mesot, L.Patthey
Band Folding in the Underdoped Surface $YBa_2Cu_3O_{6.5}$ *thin films made by PLD*
MaNEP Swiss Workshop Meeting, Les Diablerets, Switzerland, August 26-28, 2009

M. Radovic Y. Sassa, M. Månsson, Ph. Willmott, L. Patthey, J. Mesot
Pulsed Laser Deposition of $YBa_2Cu_3O_{7-x}$ *Thin Films for in situ ARPES measurement: Surface Termination and Reconstruction*
International Workshop on Strong Correlations and Angle-Resolved Photoemission Spectroscopy–CORPES09 , Zürich , Switzerland , July 19, 2009

M. R.,Y.Sassa, M. Månsson, P. Willmott, X. Cui, St. Pailhes, M. Shi, F.M. Granozio, J. Mesot and L. Patthey
Reconstruction and band folding in the underdoped surface of $YBa_2Cu_3O_{7-x}$ *thin films made by pulsed laser deposition*
Joint Users' Meeting at PSI - JUM@P '09, Villigen PSI , Switzerland, October 12-13, 2009

M. Radovic, Y. Sassa, M. Månsson, F. Miletto, J. Mesot, and L. Patthey
Fermi Surface Reconstruction of in-situ PLD grown thin films of underdoped $YBa_2Cu_3O_{7-x}$
16th International Workshop on Oxide Electronics - WOE16, Tarragona, Spain, October 4-7, 2009

J.C.E. Rasch, M. Boehm, J. Schefer, L. Keller, H. Mutka, C. Ritter, G.M. Abramova, J.F. Löffler
Spin-Lattice Coupling in $CuCrS_2$ *probed by Inelastic Neutron Scattering*
Materials Day, ETHZ , Zurich , Switzerland, March 19, 2009

J.C.E. Rasch, M. Boehm, J. Schefer, L. Keller, H. Mutka, C. Ritter, G.M. Abramova, I.G. Vasilyeva
Spin dynamics in $CuCrS_2$*, effects of magnetic order and lattice distortion*
Joint Users' Meeting at PSI - JUM@P '09, Villigen PSI, Switzerland, October 12-13, 2009

J.C.E. Rasch, D. V. Sheptyakov, M. Boehm, J. Schefer, F. Gozzo, N. V. Volkov, K.A. Sablina, G.A. Petrakovskii
Structure of $PbMn_7O_{15}$
Annual Meeting of the Swiss Crystallographic Society, Fribourg , Switzerland, September 8, 2009

E. Razzoli, M. Shi, A. Bendounan, S. Rosenkranz ,M. R. Norman, J. C. Campuzano, J. Chang, M. Månsson, Y. Sassa, O. Tjernberg, L. Patthey, N. Momono, M. Oda, C. Mudry and J. Mesot
Spectroscopic evidence for preformed Cooper pairs in the pseudogap phase of cuprates
MaNEP Swiss Workshop Meeting, Les Diablerets, Switzerland, August 26-28, 2009

E. Razzoli, M. Shi, A. Bendounan, S. Rosenkranz ,M. R. Norman, J. C. Campuzano, J. Chang, M. Månsson, Y. Sassa, O. Tjernberg, L. Patthey, N. Momono, M. Oda, C. Mudry and J. Mesot
Spectroscopic evidence for preformed Cooper pairs in the pseudogap phase of cuprates
Joint Users' Meeting at PSI - JUM@P '09 , Villigen PSI, Switzerland, October 12-13, 2009

Gelu-Marius Rotaru, B. Padmanabhan, Severian N. Gvasaliya, Bertrand Roessli, Thierry Straessle, Roger A. Cowley, Sergey G. Lushnikov and Stefan Klotz
Diffuse Scattering Study Under High Hydrostatic Pressure in $PbMg_{1/3}Nb_{2/3}O_3$
International Conference on Neutron Scattering, ICNS 2009 , Knoxville, Tennessee, USA, May 4 - 7, 2009

Y.Sassa, M. Månsson, J. Chang, X. Cui, A. Bendounan, M. Radović, J. Kanter, M. Shi, L. Patthey, B. Batlogg, and J. Mesot
Probing the Electronic Properties of $Na_{0.85}CoO_2$ by ARPES
Joint Users' Meeting at PSI - JUM@P '09, Villigen PSI, Switzerland, September 12-13, 2009

Y. Sassa, M. Månsson, J. Chang, X. Cui, A. Bendounan,M. Radovic, J. Kanter, M. Shi, L. Patthey, B. Batlogg, and J. Mesot
Probing the Electronic Properties of $Na_{0.85}CoO_2$ by Angle-Resolved Photoelectron Spectroscopy (ARPES)
MaNEP Swiss Workshop Meeting, Les Diablerets, Switzerland, August 26-28, 2009

Y. Sassa, M. Månsson, J. Chang, X. Cui, A. Bendounan, M. Radovic, J. Kanter, M. Shi, L. Patthey, B. Batlogg, and J. Mesot
Probing the Electronic Properties of $Na_{0.85}CoO_2$ by Angle-Resolved Photoelectron Spectroscopy (ARPES)
Joint Users' Meeting at PSI - JUM@P '09, Villigen PSI, Switzerland, October 12-13, 2009

J. Schefer, J. C. E. Rasch, D. V. Sheptyakov, M. Boehm, F. Gozzo, N. V. Volkov, K.A. Sablina, G.A. Petrakovskii
Structure of $PbMn_7O_{15}$ 25th European Crystallographic Meeting,
August 16-21, Istanbul, Turkey, August 16-21, 2009

M.Schneider
High Performance Supermirrors on Metallic Substratess
International Conference on Neutron Scattering, ICNS 2009, Knoxville, USA, May 4.-7.2009"

M.Schneider
High Performance Supermirrors on Metallic Substrates
Swiss Workshop on Materials with Novel Electronic Properties ’09, August 26.-28., 2009, Les Diablerets, Switzerland.

V.Sikolenko, E.Pomjakushina, A.Cervellinio
Neutron diffraction study of magnetic ordering in $Ce(Mn_{1-x}Fe_x)_2Ge_2$
European Crystollagraphical Meeteing, Istanbul, Turkey, August 17-21, 2009

J.Sugiyama, K. Mukai, H. Nozaki, M. Månsson, Y.Ikedo
Muon-spin spectroscopy for battery materials
Joint Users' Meeting at PSI - JUM@P '09, Villigen PSI, Switzerland, October 12-13, 2009

J. Sugiyama, H. Sakurai, E. Takayama-Muromachi, Y. Ikedo, O. ofer, M. Månsson, E.J. Ansaldo, J.H. Brewer, K.H. Chow
muSR study of $CaFe_2O_4$-type compounds, $NaMn_2O_4$ and $LiMn_2O_4$
The 64th Autumn Meeting of the Physical Society of Japan, Kumamoto, Japan, September 25-28, 2009

N. Tsyrulin
Quantum effects in a weakly-frustrated S=1/2 two-dimensional antiferromagnet in an applied magnetic field
MaNEP Swiss Workshop Meeting, Les Diablerets, Switzerland, August 26-28, 2009

N. Tsyrulin:
Quantum effects in S=1/2 two-dimensional Heisenberg antiferromagnet in applied magnetic field
XXI IUCr Congress. Osaka, Japan, 23-31 August 2008.

J. White
Flux line lattice form factor anisotropy and deciphering the role of non-locality in the mixed state of twin-free $YBa_2Cu_3O_7$
CMMP 2009, Warwick, U.K., December 15-17, 2009

J. White
Pauli paramagnetic effects on the flux line lattice of $CeCoIn_5$ CMMP 2009
Warwick , U.K,December 15-17, 2009

O. Zaharko
$FeTe_2O_5Br$ system: a new ferroelectric with a spin amplitude modulation
Polarized neutrons and synchrotron x-rays for magnetism 2009, Bonn , Germany , August 3, 2009

BOOK CHAPTERS

Mesot J., Furrer A., Strässle Th.
Neutron Scattering in Condensed Matter Physics - Series on Neutron Techniques and Applications
World Scientific, Singapore
ISBN-13 978-981-02-4830-7

Philip L.W.Tregenna-Piggott, Mark Riley
The Jahn-Teller Effect, Fundamentals and Implications for Physics and Chemistry
Horst Koeppel, David R. Yarkony and Heinz Barentzen
Springer Series in Chemical Physics, pp 371 – 415 (2009)

MEMBERSHIP IN EXTERNAL COMMITTEES

Furrer Albert
- International Advisory Board of the Centre of Competence in Nanoscience and Advanced Materials (Jagiellonian University, Cracow, Poland), member (since 2002)
- Sonderforschungsbereich 463 der Deutschen Forschungsgemeinschaft (DFG) über Seltenerd-Übergangsmetallverbindungen: Struktur, Magnetismus und Transport, Dresden, Gutachter (since 2005)
- Third World Academy of Sciences (TWAS) of the Abdus Salam International Centre for Theoretical Physics (ICTP, Trieste), advisor (since 2003)
- Editorial Advisory Board, The Open Superconductors Journal, (since 2008)
- Advisor, 3rd World Academy of Science; (since 2009)

Geue, Thomas
- Scientific Advisory Committee Budapest Neutron Center, BNC, Budapest, Hungary, (since 01.01.2008)
- User Selection Panel, BNC Budapest, Hungary Advisory Board, (Since 2008)

Gvasaliya, Severian
- Program Committee, RCBJSF-10, TITech, Yokohama, Japan, (December 1 2008-July 2010)

Kohlbrecher, Joachim
- Scientific Advisory Committee ILL, ILL Grenoble, France Nov 08 Forschungskommission
- Scientific Advisory Committee NCNR, NIST Center for Neutron Research, (since 2007)

Lefmann Kim
- Member of Jülich proposal committee
- vice director in the board of DANSCATT (infor under Kell mortensen)
- member of the FRM-2 proposal committee

Mortensen Kell
- DANSCATT, Chair, Board of Neutron Scattering Centre supported by the Danish Research Council for Nature and Universe
- DANSCATT, Chair, Board of Neutron Scattering Centre supported by the Danish Research Council for Nature and Universe
- DANSSK, Chair of Danish Neutron Scattering Association
- ESS-Scandinavia, Chair of ESS-S Management
- ESS-Scandinavia, Vice Chair of ESS-S Council
- Member of PSI-SINQ Scientific Committee

Pomjakushin, Vladimir
- Scientific Advisory Committee ILL, Magnetism, ILL Grenoble, France, (since 2009)

Roessli Bertrand
- Scientific Advisory Committee, International Symposium on the Dynamic Properties of Solids, (until 1.6.2009)
- Scientific Advisory Board; Flipper 2010 Conference, Grenoble, (2009-2010)
- Scientific Advisory Board; PNCMI (since 2009)

Schefer, Jürg
- Evaluation Board, MaMaSELF (since 2009)
- Secretary Swiss Society for Crystallography/Editor SGK/SSCr-Newsletter (since 2006)
- Summer School on Condensed Matter Research, yearly, Zuoz, CH: organizing committee (2008-2009)
- European Association for Crystallography, Representative of Switzerland (since 2007)
- Scientific Advisory Committee FRM-II, structure, FRM-II, Munich, Germany (since 2008)

Tregenna-Piggott, Philip
- Scientific Advisory Committee for the DNA Backscattering Spectrometer J-PARC Japan, since February 2008

Zheludev, Andrey
- Avisory Board MANEP Winter Schools, yearly school
- MANEP Scientific Advisory Board
- Zuoz Summer School on Condensed Matter Research, yearly, Zuoz, Switzerland, organizing committee (since 2009)

NOMINATIONS

Professor Ch. Niedermayer, S-Research University of Connecticut, USA

LECTURES AND COURSES

U. Gasser
Condensed Matter III: Soft Matter
University of Fribourg,
Department of Physics Fribourg, Switzerland, April-May 2009,

J. Kohlbrecher
Small-Angle Scattering (SAS)
ETH Zuerich (LMVT), Zuerich, Switzerland, April 09

J. Kohlbrecher
Aplications of neutrons, Uni Groningen, Emmen, Netherland
2 - 5 November 2009, FANTOM school

M. Laver
Magnetic SANS Tutorial
NIST Center for Neutron Research, Gaithersburg, USA, February, 24-26, 2009

J. Schefer
Magnetic scattering with neutron diffractions
MaMaSELF, Erasmus Mundus Sommer School, Rennes, France, Sept. 21-25, 2009,
6 lecture / year cycle of seminars

Th. Strässle
Neutron scattering in condensed matter physics,
402-0544-00L ETH Zurich, ETH Hönggerberg, Switzerland, 15.9.-18.12.2009 Physics masters course ETH

B. Thielemann
Neutron Scattering in Condensed Matter Physics
ETH Zurich, ETH Hönggerberg, Switzerland

Ph. Tregenna-Piggott
Magnetism and Spectroscopy   Department of Chemistry
University of Bern, Switzerland, Feb.12-16, 2009

Ph. Tregenna-Piggott
Anorg.Chemie/ Quantenchemie
Paul Scherrer Institut, PSI, Switzerland, 2.November-21.12.2009

O. Zaharko
Introduction to neutron facilities, Large facilities for crystallography, Paul Scherrer Institut PSI, Switzerland, Feb.12-October 2009

O. Zaharko
TriCS - single crystal neutron diffractometer   Large facilities for crystallography, PSI, Switzerland, February, 12-October 2009

A. Zheludev
Neutron scattering in condensed matter physics,
402-0544-00L   ETH Zurich, ETH Hönggerberg, Switzerland, 15.9.-18.12.2009
Physics masters course ETH

A. Zheludev
Neutron scattering in condensed matter physics,
402-0544-00L   ETH Zurich, ETH Hönggerberg, Switzerland, 15.9.-18.12.2009 Physics masters course ETH

DIPLOMA

S.M. Gerber
Interplay of Superconductivity and Magnetism in Unconventional Superconductors
Oct 2008 – Feb 2009, ETH Zürich (collaboration with LNS)

G.B. Pascua
3D Layered Materials for Spintronics
Feb 2009 – July 2009 (LMU Munich, MaMaSELF, PSI, ILL)

DISSERTATION

M. Janoscheck
Polarized neutron scattering studies of magnetic compounds

C. Krämer
From Quantum Phase Transitions to Addressable Spin Clusters in LiREF4

P. Huber
X-ray and neutron scattering investigations of colloidal assemblies

B. Thielemann
Spin Ladder Physics

J. Hoppler
Novel superconducting ferromagnetic quantum states in oxide superlattices
Université de Fribourg, ph.D., in progress

Condensed Matter Research with Neutrons and Muons

Spallation Neutron Source Division (ASQ)

LIST OF PUBLICATIONS (PEER REVIEWED)

Bitzek E, Brandl C, Weygand D, Derlet PM, Van Swygenhoven H
Atomistic simulation of a dislocation shear loop interacting with grain boundaries in nanocrystalline aluminium
Modelling And Simulation In Materials Science And Engineering **17**, 055008 (2009)

Blau B, Clausen KN, Gvasaliya S, Janoschek M, Janssen S, Keller L, Roessli B, Schefer J, Tregenna-Piggott P, Wagner W, Zaharko O
The Swiss Spallation Neutron Source SINQ at Paul Scherrer Institut
Neutron News **20 (3)**, 5 (2009)

Brandl C, Derlet PM, Van Swygenhoven H
Strain rates in molecular dynamics simulations of nanocrystalline metals
Philosophical Magazine **89**, 3465 (2009)

Carminati A, Fluhler H
Water Infiltration and Redistribution in Soil Aggregate Packings
Vadose Zone Journal **8**, 150 (2009)

Chiesa S, Derlet PM, Dudarev SL
Free energy of a << 110 >> dumbbell interstitial defect in bcc Fe: Harmonic and anharmonic contributions
Physical Review B **79**, 214109 (2009)

Chiesa S, Derlet PM, Dudarev SL, Van Swygenhoven H
Atomistic calculation of elastic constants of alpha-iron containing point defects by means of magnetic interatomic potentials
Journal of Nuclear Materials **386**, 49 (2009)

Chiesa S, Gilbert MR, Dudarev SL, Derlet PM, Van Swygenhoven H
The non-degenerate core structure of a 1/2 < 111 > screw dislocation in bcc transition metals modelled using Finnis-Sinclair potentials: The necessary and sufficient conditions
Philosophical Magazine **89**, 3235 (2009)

Conesa HM, Moradi AB, Robinson BH, Kuhne G, Lehmann E, Schulin R
Response of native grasses and Cicer arietinum to soil polluted with mining wastes: Implications for the management of land adjacent to mine sites
Environmental And Experimental Botany **65**, 198 (2009)

Dai Y, Wagner W
Materials researches at the Paul Scherrer Institute for developing high power spallation targets
Journal of Nuclear Materials **389**, 288 (2009)

Derlet PM, Gumbsch P, Hoagland R, Li J, McDowell DL, Van Swygenhoven H, Wang J
Atomistic Simulations of Dislocations in Confined Volumes
Mrs Bulletin **34**, 184 (2009)

Derlet PM, Van Petegem S, Van Swygenhoven H
Vibrational properties of grain boundaries in nanocrystalline Ni using second moment potentials
Philosophical Magazine **89**, 3511 (2009)

Donath T, Pfeiffer F, Bunk O, Groot W, Bednarzik M, Grunzweig C, Hempel E, Popescu S,

Hoheisel M, David C
Phase-contrast imaging and tomography at 60 keV using a conventional x-ray tube source
Review of Scientific Instruments **80**, 053701 (2009)

Dudarev SL, Boutard JL, Lasser R, Caturla MJ, Derlet PM, Fivel M, Fu CC, Lavrentiev MY, Malerba L, Mrovec M, Nguyen-Manh D, Nordlund K, Perlado M, Schaublin R, Van Swygenhoven H, Terentyev D, Wallenius J, Weygand D, Willaime F
The EU programme for modelling radiation effects in fusion reactor materials: An overview of recent advances and future goals
Journal of Nuclear Materials **386**, 1 (2009)

Elsener A, Politano O, Derlet PM, Van Swygenhoven H
Variable-charge method applied to study coupled grain boundary migration in the presence of oxygen
Acta Materialia **57**, 1988 (2009)

Evans A, Van Petegem S, Van Swygenhoven H
POLDI: Materials Science and Engineering Instrument at SINQ
Neutron News **20 (3)**, 17 (2009)

Frei G, Lehmann EH, Mannes D, Boillat P
The neutron micro-tomography setup at PSI and its use for research purposes and engineering applications
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **605**, 111 (2009)

Grosse M, Lehmann E, Steinbruck M, Kuhne G, Stuckert J
Influence of oxide layer morphology on hydrogen concentration in tin and niobium containing zirconium alloys after high temperature steam oxidation
Journal of Nuclear Materials **385**, 339 (2009)

Henry J, Averty X, Dai Y, Pizzanelli JP, Espinas JJ
Tensile properties of ODS-14%Cr ferritic alloy irradiated in a spallation environment
Journal of Nuclear Materials **386**, 345 (2009)

Huang HC, Van Swygenhoven H
Atomistic Simulations of Mechanics of Nanostructures
Mrs Bulletin **34**, 160 (2009)

Josic L, Lehmann EH, Frei G, Tamaki M
Cold neutron imaging near Bragg edges as a tool for material research
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **605**, 21 (2009)

Lehmann EH, Boillat P, Scherrer G, Frei G
Fuel cell studies with neutrons at the PSI's neutron imaging facilities
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **605**, 123 (2009)

Lehmann EH, Frei G, Vontobel P, Josic L, Kardjilov N, Hilger A, Kockelmann W, Steuwer A
The energy-selective option in neutron imaging
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **603**, 429 (2009)

Lehmann EH, Josic L, Frei G
Material Research with Neutron Imaging Methods at SINQ
Neutron News **20 (3)**, 20 (2009)

Li L, Anderson PM, Lee MG, Bitzek E, Derlet P, Van Swygenhoven H
The stress-strain response of nanocrystalline metals: A quantized crystal plasticity approach
Acta Materialia **57**, 812 (2009)

Maass R, Van Petegem S, Borca CN, Van Swygenhoven H
In situ Laue diffraction of metallic micropillars
Materials Science And Engineering A-Structural Materials Properties Microstructure And Processing **524**, 40 (2009)

Maass R, Van Petegem S, Ma DC, Zimmermann J, Grolimund D, Roters F, Van Swygenhoven H, Raabe D
Smaller is stronger: The effect of strain hardening
Acta Materialia **57**, 5996 (2009)

Mannes D, Josic L, Lehmann E, Niemz P
Neutron attenuation coefficients for non-invasive quantification of wood properties
Holzforschung **63**, 472 (2009)

Mannes D, Lehmann E, Cherubini P, Niemz P
Neutron imaging versus standard X-ray densitometry as method to measure tree-ring wood density (vol 21, pg 605, 2007)
Trees-Structure And Function **23**, 1123 (2009)

Mannes D, Marone F, Lehmann E, Stampanoni M, Niemz P
Application areas of synchrotron radiation tomographic microscopy for wood research
Wood science and technology **doi 10.1007/**, s00226-009-0257-2 (2009)

Mannes D, Niemz P, Lehmann E
Tomographic investigations of wood from macroscopic to microscopic scale
Wood Research 54, 33 (2009)

Mannes D, Sonderegger W, Hering S, Lehmann E, Niemz P
Non-destructive determination and quantification of diffusion processes in wood by means of neutron imaging
Holzforschung **63**, 589 (2009)

Moradi AB, Conesa HM, Robinson B, Lehmann E, Kuehne G, Kaestner A, Oswald S, Schulin R
Neutron radiography as a tool for revealing root development in soil: capabilities and limitations
Plant And Soil **318**, 243 (2009)

Moradi AB, Conesa HM, Robinson BH, Lehmann E, Kaestner A, Schulin R
Root responses to soil Ni heterogeneity in a hyperaccumulator and a non-accumulator species
Environmental Pollution **157**, 2189 (2009)

Oliver BM, Dai Y
Helium and hydrogen measurements on pure materials irradiated in SINQ Target 4
Journal of Nuclear Materials **386**, 383 (2009)

Patorski JA, Gindrat M
High Heat Flux sensor for IRT determination of HTC of liquid metal cooled targets wall
Proceedings of The Spie - The International Society For Optical Engineering **7299**, 729905-1 (2009)

Peterson AA, Vontobel P, Vogel F, Tester JW
Normal-phase dynamic imaging of supercritical-water salt precipitation using neutron radiography
Journal of Supercritical Fluids **49**, 71 (2009)

Strobl M, Kardjilov N, Hilger A, Kuhne G, Frei G, Manke I
High-resolution investigations of edge effects in neutron imaging
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **604**, 640 (2009)

Thilly L, Van Petegem S, Renault PO, Lecouturier F, Vidal V, Schmitt B, Van Swygenhoven H
A new criterion for elasto-plastic transition in nanomaterials: Application to size and composite effects on Cu-Nb nanocomposite wires
Acta Materialia **57**, 3157 (2009)

Tong Z, Dai Y
Tensile properties of the ferritic martensitic steel F82H after irradiation in a spallation target
Journal of Nuclear Materials **385**, 258 (2009)

Tremsin AS, McPhate JB, Vallerga JV, Siegmund OHW, Hull JS, Feller WB, Lehmann E
Detection efficiency, spatial and timing resolution of thermal and cold neutron counting MCP detectors
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **604**, 140 (2009)

Tremsin AS, McPhate JB, Vallerga JV, Siegmund OHW, Hull JS, Feller WB, Lehmann E
High-resolution neutron radiography with microchannel plates: Proof-of-principle experiments at PSI
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **605**, 103 (2009)

Van Langh R, Lehmann E, Hartmann S, Kaestner A, Scholten F
The study of bronze statuettes with the help of neutron-imaging techniques
Analytical And Bioanalytical Chemistry **395**, 1949 (2009)

Van Petegem S, Brandstetter S, Maass R, Hodge AM, El-Dasher BS, Biener J, Schmitt B, Borca C, Van Swygenhoven H
On the Microstructure of Nanoporous Gold: An X-ray Diffraction Study
Nano Letters **9**, 1158 (2009)

Van Petegem S, Brandstetter S, Schmitt B, Van Swygenhoven H
Creep in nanocrystalline Ni during X-ray diffraction
Scripta Materialia **60**, 297 (2009)

Vidal V, Thilly L, Van Petegem S, Stuhr U, Lecouturier F, Renault PO, Van Swygenhoven H
Plasticity of nanostructured Cu-Nb-based wires: Strengthening mechanisms revealed by in situ deformation under neutrons
Scripta Materialia **60**, 171 (2009)

Wagner W, Seidel M, Morenzoni E, Groeschel F, Wohlmuther M, Daum M
PSI status 2008-Developments at the 590 MeV proton accelerator facility
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **600**, 5 (2009)

Zhou Y, Van Petegem S, Segers D, Erb U, Aust KT, Palumbo G
On Young's modulus and the interfacial free volume in nanostructured Ni-P
Materials Science And Engineering A-Structural Materials Properties Microstructure And Processing **512**, 39 (2009)

CONFERENCE, WORKSHOP AND SEMINAR CONTRIBUTIONS

B. Blau, KN Clausen, S. Gvasaliya, M. Janoschek, S. Janssen, L. Keller, B. Roessli, J. Schefer, P. Tregenna-Piggott, W. Wagner, O. Zaharko
The Swiss Spallation Neutron Source SINQ at Paul Scherrer Institut
Neutron News **20**, 5 (2009)

L. Josic
Energy selective imaging of structural materials
Neuwave-2 workshop, 2nd workshop on neutron wavelength depended imaging, Cosener's House Abingdon, UK, 12-15 July 2009.

L. Z. Josic, E. H. Lehmann, A. Kaestner
Quantitative Neutron Radiography and Tomography
IEEE Nuclear Science Symposium, Orlando, 25-31 October, 2009

A.Kaestner and E.H. Lehmann
Status and Progress in Cold Neutron Imaging
IEEE Nuclear Science Symposium, Orlando, 25-31 October, 2009

E. H. Lehmann, A. Kaestner, L. Josic
Contrast Mechanism in Neutron Imaging, State of the art
IEEE Nuclear Science Symposium, Orlando, 25-31 October, 2009

E.H. Lehmann, A. Kaestner, Lidija Josic W. Wagner
Neutron Imaging at Spallation Neutron Sources
ANS 2009 Winter Meeting, Washington DC, Nov. 15-19, 2009

E.H. Lehmann, D. Mannes
Non-destructive wood analysis with radiation transmission methods within COST-IE0601
Symposium about mobile source technology within COST-MP0601, May 14-15, 2009, Salamanca, Spain

E.H. Lehmann, L. Josic, A. Kaestner
Why to build a neutron imaging facility at a pulsed spallation source ?
NEUWAVE-2, 2nd Workshop on Neutron Wavelength dependent imaging, July 12-15, 2009, Abingdon, UK

E.H. Lehmann, S. Hartmann, M. Salque, M. Speidel
Investigation of the content of anchient tibetian bronze Buddha statues by means of neutron imaging methods,
TECHNART2009, April 27-30, 2009, Athens, Greece

P. Vontobel
Neutron radiography used for the analysis of humidity in soil
Monte-Verità Conference, Preferential and unstable flow in porous media - from water flow to gas injection Centro Stefano Franscini, Ascona, 29 March to 3 April 2009.

W. Wagner, on behalf of the MEGAPIE collaboration
The MEGAPIE operation synthesis
Proceedings of HeLiMeRT 2009, 5th International Workshop on Materials for Heavy Metal cooled Reactors and Related Technologies, Mol, Belgien, April 20-22, 2009

W. Wagner
Operation synthesis of MEGAPIE, the first liquid metal target driven by a megawatt class proton beam
Transactions of the American Nuclear Society **101** (2009)

W. Wagner et al.
PSI status 2008 - Developments at the 590 MeV proton accelerator facility
1st J-PARC International Symposium on Pulsed Neutron and Muon Sciences
Nucl. Instr. Meth. A **600** (2009) 5

INVITED TALKS

B. Blau
Status of the Ultracold Neutron Source at PSI
ICNS2009, 3-7 May 2009, Knoxville, TN, USA

Y. Dai, W. Wagner
The Status of Studies on Structural Materials under High Energy Proton and Neutron Mixed Spectrum
International Topical Meeting on Nuclear Research Applications and Utilization of Accelerators, 4-8 May 2009, Vienna, Austria

Y. Dai, W. Wagner
The Status of Studies on Structural Materials under High Energy Proton and Neutron Mixed Spectrum
ANS 2009 Winter Meeting, Washington DC, USA, Nov. 15-19, 2009

Y. Dai
Study Radiation Damage Effects in Structural Materials using Swiss Spallation Neutron Source and Swiss Light Source Facilities
Inter. Workshop on Research Needs and Opportunities for Characterization of Activated Samples at Neutron and X-Ray User Facilities, 20-22 September 2009, Santa Fe, USA

E.H. Deschler-Erb, E.Lehmann,
Römische Bronzekunst unter der Lupe - Archäologische Forschung und Neutronentomographie im Teamwork
Symposium am HZB „Kulturgut durchleuchtet – Strahlung trifft Kulturgut“, Berlin, 4.-5.November 2009

L. Josic
Quantitative neutron imaging of structural Materials
ICNS2009 conference, International Conference on Neutron Scattering, Knoxville, Tennessee, USA, 3-7 May 2009.

L. Josic
Quantitative Neutron Radiography and Tomography-energy selective approach
IEEE conference, Nuclear Science Symposium and Medical Imaging Conference, Orlando, Florida, USA, 25-31 October 2009

E. H. Lehmann. A. Kaestner, L. Josic, presented by W. Wagner
Neutron Imaging at Spallation Neutron Sources
ANS 2009 Winter Meeting, Washington DC, USA, Nov. 15-19, 2009

E.H. Lehmann, S. Hartmann, E. Deschler-Erb
Neutron imaging methods for the non-invasive investigation of cultural heritage objects
IEEE-Conference NSS-MIC, Orlando, 25-32 Oct., 2009

E.H. Lehmann, A. Kaestner, L. Josic
Contrast Mechanism in Neutron Imaging – an overview
IEEE-Conference NSS-MIC, Orlando, 25-32 Oct., 2009

H. Van Swygenhoven
Understanding the Mechanical Behavior of Materials using Photons and Neutrons
Hereaus Lecture
Photons and Neutrons as Probes of Matter
14 – 16 December 2009 at the Physikzentrum Bad Honnef (Germany)

H. Van Swygenhoven
Oxygen in Grain Boundaries of Aluminum: A Molecular Dynamics Study
Invited lecture in the symposium “mechanical behaviour of nanostructured materials” held at the TMS ’09 annual meeting, San Francisco, February 2009

H. Van Swygenhoven
Micro-mechanical insights from in-situ X-ray and neutron diffraction
Keynote lecture in the symposium “Neutron and X-Ray Studies of Advanced Materials” ” held at the TMS ’09 annual meeting, San Francisco, February 2009

H. Van Swygenhoven
Dislocation mechanism in nanocrystalline metals: atomistic simulations and experiments
Invited lecture in the symposium “Synergies of Computational and Experimental Materials Science” held at the TMS ’09 annual meeting, San Francisco, February 2009

H. Van Swygenhoven
Plasticity in confined volumes: simulations and experiments
Invited lecture in the “Institut für Metallkunde und Metallphysik” from Prof. G. Gottstein, RWTH-Aachen, March 3rd, 2009

H. Van Swygenhoven
Invited talk at the CCMX annual meeting, Bern April 22nd

H. Van Swygenhoven
Invited seminar at the "FEMaS Summer School on Micromechanical Experiments" organized by the Erich Schmid Institute of Materials Science, Leoben (Austria), July 6-10th 2009

H. Van Swygenhoven
X-rays in biology, life, energy, environment and nano science
Invited lecture at the 2009 X-Ray Science Gordon Research Conference, Watervill, Maine Aug. 2-7, 2009

H. Van Swygenhoven
In-situ Laue diffraction during compression of Mo pillars
Talk at the International Conference of Strength of Materials ICSMA 2009, Dresden 16-21

H. Van Swygenhoven
Invited lecture at the Materials Days Rostock July 9-10, 2009 organized by the University of Rostock, Germany

H. Van Swygenhoven
Invited lecture in the series "Materials Simulation Center Distinguished Lecture Series", organized by the Materials Simulation Center and administered by the Mechanical & Nuclear Engineering, Department at Penn State, October 27th Pittsburg, USA

H. Van Swygenhoven
Invited lecture in the symposium "Integrated Computational and Experimental Investigations on Microstructure Evolution of Coarsening Systems"
TMS-MS&T'09 conference in Pittsburgh, October 25-29 2009, Long-Qing Chen (Penn State) USA

P. Vontobel
Neutron Imaging: Method and Facilities.
Scoping Workshop on New Guides, Instruments and Sample-Environment Apparatus at OPAL, Lucas Heights, 27-28 August 2009.

W. Wagner, E. Lehmann
Neutron Imaging – a promising tool in materials science and technology
TMS2009: 138th Annual Meeting & Exhibition, San Francisco, USA, Feb. 15-19, 2009

W. Wagner
Design concepts of and lessons learned from the SINQ high power target development programm
ESS Bilbao Initiative Workshop, Bilbao, Spain, March 16-18, 2009

W. Wagner
EURISOL Spallation Neutron Source status and perspectives
EURISOL town meeting, Pisa, Italy, 30 March – 1 April, 2009

W. Wagner
Representative prototype of the EURISOL compact mercury target
HeLiMeRT 2009, 5th International Workshop on Materials for Heavy Metal cooled Reactors and Related Technologies, Mol, Belgien, April 20-22, 2009

W. Wagner
The MEGAPIE operation synthesis
HeLiMeRT 2009, 5th International Workshop on Materials for Heavy Metal cooled Reactors and Related Technologies, Mol, Belgien, April 20-22, 2009

W. Wagner
Radiation Damage by Protons and Spallation Neutrons
Joint EC-IAEA Topical Meeting on 'Development of New Structural Materials for Advanced Fission and Fusion Reactor Systems', Barcelona, Spain, Oct. 5-9, 2009

W. Wagner
The MEGAPIE operation synthesis
AccApp09: International Topical Meeting on Nuclear Research Applications and Utilization of Accelerators, Vienna, Austria, May 4-8, 2009

W. Wagner
Operation synthesis of MEGAPIE, the first liquid metal target driven by a megawatt class proton beam
ANS 2009 Winter Meeting, Washington DC, USA, Nov. 15-19, 2009

W. Wagner
MEGAPIE experiment
Breaking News: Status of U.S. and World Accelerator Programs – Panel
ANS 2009 Winter Meeting, Washington DC, USA, Nov. 15-19, 2009

LECTURES AND COURSES

Hajo Heyck
Kerntechnik
Vorlesung an der Fachhochschule Nordwestschweiz (FHNW) Brugg-Windisch, (University of Applied Sciences, Northwest Switzerland)

P. Vontobel
Introduction to advanced radiation methods
Advanced Radiography Methods in Wood Research (ADRAM-09), COST-Action IE-0601, PSI, Villigen, Nov 16-20, 2009

E.H. Lehmann, D. Mannes
Facilities for non-destructive testing at PSI (realated to wood)
Advanced Radiography Methods in Wood Research (ADRAM-09), COST-Action IE-0601, PSI, Villigen, Nov 16-20, 2009

A. Kaestner
Tomography with neutrons and photons
PSI Summer school on condensed matters – Functional materials, Zuoz, August 1-10, 2009

A. Kaestner
Introduction to image processing
Advanced Radiography Methods in Wood Research (ADRAM-09), COST-Action IE-0601, PSI, Villigen, Nov 16-20, 2009

MEMBERSHIP IN INTERNAL COMMITTEES

H. Van Swygenhoven
- Elected member of the PSI research commission (FOKO)

MEMBERSHIP IN EXTERNAL COMMITTEES

H. Heyck
- Basic Energy Sciences Review of the Lujan Neutron Scattering Center Los Alamos Neutron Science Center
- DOE Basic Energy Sciences Triennial Review of Spallation Neutron Source SNS and High Flux Isotope Reactor HFIR

E.H. Lehmann
- Scientific Advisory Committee, FRM-2, Germany (since 2008)
- Beam Instruments Advisory Group, OPAL, ANSTO, Australia (since 2009)
- Steering Committee COST-Action IE0601 (since 2008)

H. Van Swygenhoven
- Member of the reviewing commission of the proposals for beam time at the instruments at FRM II
- Elected by the EC-commission as a member of the External Advisory Group (EAG) of the NMP program with respect to FP7 and FP8.
- Elected member of the International Advisory Committee of the International Risø Symposium on Materials Science
- Members of the Editorial Advisory Panel of the journal “Materials Today”,
- Vice chair of the International Committee of Strength of Materials (ICSMA)

W. Wagner
- International Neutron Technology Advisory Committee (ATAC) of Chinese Spallation Neutron Source (CSNS)

EDITOR

H. Van Swygenhoven
Volume editor in the special issue of MRS Bulletin 2009, “Atomistic simulations of nanomechanics of nanostructures” Hanchen Huang and Helena Van Swygenhoven, Guest Editors, MRS Bulletin 34(3) March 2009

BOOK CHAPTER

E.H. Lehmann
Neutron Imaging Methods and Applications
Neutron Applications in Earth, Energy and Environmental Sciences
Chapter 11, Springer Science (2009)

E.H. Lehmann, A. Kaestner
3D Neutron Imaging
Encyclopedia of Analytical Chemistry, R.A. Meyers (ed.), John Wiley & Sons Ltd (2009)

DIPLOMA

Alice Goncalves Osorio
In-situ mechanical testing at SINQ and SLS
Master degree in materials science exploiting large-scale facilities (MAMASELF)
February 2009 – July 2009

DISSERTATIONS

B. Long
Liquid Lead-Bismuth Emrittlement Effects on Unirradiated and Irradiated Ferritic/Martensitic Steels for Nuclear Applications
EPFL Thesis No 4355, 2009

R. Maaß
In-situ Laue diffraction on deforming micropillars
EPFL Thesis No 4468, 2009

D. Mannes
Non-Destructive Testing of Wood by Means of Neutron Imaging in Comparison with Similar Methods
ETH Thesis No 18563

C. Brandl
Deformation mechanism in nanocrystalline fcc metals dtusied by atomistic simulations
EPFL Thesis No 4591, 2009

AWARDS

R. Maaß
Nachwuchspreis Deutsche Gesellschaft für Materialkunde

Condensed Matter Research with Neutrons and Muons

Laboratory of Muon Spectroscopy (LMU)

LIST OF PUBLICATIONS (PEER REVIEWED)

Alberto HV, Duarte JPP, Weidinger A, Vilao RC, Campos Gil JMS, Ayres de Campos N, Fostiropoulos K, Prokscha T, Suter A, Morenzoni E
Low-energy-muon [LEM] study of Znphthalocyanine and ZnO thin films
Physica B **404**, 870 (2009)

Amato A, Khasanov R, Luetkens H, Klauss HH
Probing the ground state properties of iron-based superconducting pnictides and related systems by muon-spin spectroscopy
Physica C-Superconductivity And Its Applications **469**, 606 (2009)

C Duan T, Nakano T, Matsumoto J, Suehiro R, Watanabe I, Suzuki T, Kawamata T, Amato A, L Pratt F, Nozue Y
muSR Study on Ferromagnetic Properties of Rb Clusters Incorporated into Zeolite A
Physica B **404**, 634 (2009)

Carretta P, Pasero R, Giovannini M, Baines C
Magnetic-field-induced crossover from non-Fermi to Fermi liquid at the quantum critical point of YbCu5-xAux
Physical Review B **79**, 020401(R) (2009)

Chapuis Y, de Reotier PD, Marin C, Yaouanc A, Forget A, Amato A, Baines C
Probing the ground state of Gd2Sn2O7 through mu SR measurements
Physica B-Condensed Matter **404**, 686 (2009)

Chow KH, MacFarlane WA, Salman Z, Fan I, Crerar SJ, Mar A, Egilmez M, Jung J, Hitti B, Arseneau D
Local magnetism in YbCrSb3, an anomalous member of the RECrSb3 series
Physica B-Condensed Matter **404**, 615 (2009)

Di Castro D, Khasanov R, Shengelaya A, Conder K, Jang DJ, Park MS, Lee SI, Keller H
Comparative study of the pressure effects on the magnetic penetration depth in electron- and hole-doped cuprate superconductors
Journal of Physics-Condensed Matter **21**, 275701 (2009)

Dilger H, Hess S, Scheuermann R, Vujosevic D, McKenzie I, Roduner E
Local ordering in quadrupolar liquids observed by the hyperfine couplings of the cyclohexadienyl radical
Physica B-Condensed Matter **404**, 927 (2009)

Drew AJ, Hoppler J, Schulz L, Pratt FL, Desai P, Shakya P, Kreouzis T, Gillin WP, Suter A, Morley NA, Malik VK, Dubroka A, Kim KW, Bouyanfif H, Bourqui F, Bernhard C, Scheuermann R, Nieuwenhuys GJ, Prokscha T, Morenzoni E
Direct measurement of the electronic spin diffusion length in a fully functional organic spin valve by low-energy muon spin rotation
Nature Materials **8**, 109 (2009)

Drew AJ, Niedermayer C, Baker PJ, Pratt FL, Blundell SJ, Lancaster T, Liu RH, Wu G, Chen XH, Watanabe I, Malik VK, Dubroka A, Roessle M, Kim KW, Baines C, Bernhard C
Coexistence of static magnetism and superconductivity in SmFeAsO1-xFx as revealed by muon spin rotation
Nature Materials **8**, 310 (2009)

Duan TC, Nakano T, Matsumoto J, Suehiro R, Watanabe I, Suzuki T, Kawamata T, Amato A, Pratt FL, Nozue Y
mu SR study on ferromagnetic properties of Rb clusters incorporated into zeolite A
Physica B-Condensed Matter **404**, 634 (2009)

Dubman M, Shiroka T, Luetkens H, Rothermel M, Litterst J, Morenzoni E, Suter A, Spemann D, Equinazi P, Setzer A, Butz T
Low-energy muSR and SQUID evidence of magnetism in highly oriented pyrolytic graphite
Journal of Magnetism And Magnetic Materials **In Press**, 1 (2009)

Egilmez M, Abdelhadi M, Salman Z, Chow KH, Jung J
Enhancement of the magnetotransport and magnetoresistive anisotropy in Sm0.55Sr0.45MnO3/Nd0.55Sr0.45MnO3 bilayers
Applied Physics Letters **95**, 112505 (2009)

Egilmez M, Salman Z, Chow KH, Jung J
Effects of correlated disorder on the magneto-transport in colossal magnetoresistance manganites
Physica Status Solidi-Rapid Research Letters **3**, 94 (2009)

Eshchenko D, Storchak VG, Morenzoni E, Prokscha T, Suter A, Liu X, Furdyna J
Low energy muSR studies of semiconductor interfaces
Physica B **404**, 873 (2009)

Eshchenko DG, Storchak VG, Cottrell SP
Muon track induced current measurements in semi-insulating GaAs
Physica B-Condensed Matter **404**, 880 (2009)

Eshchenko DG, Storchak VG, Cottrell SP
RF-mu SR in electric fields studies of GaP
Physica B-Condensed Matter **404**, 876 (2009)

Eshchenko DG, Storchak VG, Cottrell SP, Morenzoni E
Electric-Field-Enhanced Neutralization of Deep Centers in GaAs
Physical Review Letters **103**, 216601 (2009)

Eshchenko DG, Storchak VG, Morenzoni E, Andreica D
High-pressure muon spin rotation studies of magnetic semiconductors: EuS
Physica B-Condensed Matter **404**, 903 (2009)

Evtushinsky DV, Inosov DS, Zabolotnyy VB, Viazovska MS, Khasanov R, Amato A, Klauss HH, Luetkens H, Niedermayer C, Sun GL, Hinkov V, Lin CT, Varykhalov A, Koitzsch A, Knupfer M, Buchner B, Kordyuk AA, Borisenko SV
Momentum-resolved superconducting gap in the bulk of Ba1-xKxFe2As2 from combined ARPES and mu SR measurements
New Journal of Physics **11**, 055069 (2009)

Fan I, Chow KH, Egilmez M, Hitti B, Carroll BR, Vernon JE, Mansour AI, Scheuermann R, Schultz BE, MacFarlane WA, Jung J, Lichti RL
Muonium dynamics in doped Si probed by photoexcited TF-mu SR measurements
Physica B-Condensed Matter **404**, 852 (2009)

Fan I, Chow KH, Hitti B, Mansour AI, Scheuermann R, MacFarlane WA, Schultz BE, Egilmez M, Jung J, Celebi YG, Bani-Salameh HN, Carroll BR, Vernon JE, Lichti RL
Diamagnetic states in germanium studied by the photo-excited TF-mu SR measurements
Physica B-Condensed Matter **404**, 849 (2009)

Fan I, Chow KH, Parolin TJ, Egilmez M, Hossain MD, Jung J, Keeler TA, Kiefl RF, Kreitzman SR, Levy CDP, Ma R, Morris GD, Pearson MR, Saadaoui H, Salman Z, Smadella M, Song Q, Wang D, Xu M, MacFarlane WA
beta-NMR of a thin Pt film
Physica B-Condensed Matter **404**, 906 (2009)

Fuchs G, Drechsler SL, Kozlova N, Bartkowiak M, Hamann-Borrero JE, Behr G, Nenkov K, Klauss HH, Maeter H, Amato A, Luetkens H, Kwadrin A, Khasanov R, Freudenberger J, Kohler A, Knupfer M, Arushanov E, Rosner H, Buchner B, Schultz L
Orbital and spin effects for the upper critical field in As-deficient disordered Fe pnictide superconductors
New Journal of Physics **11**, 075007 (2009)

Graf MJ, Klatsky J, Johnson RC, Lascialfari A, Amato A, Baines C, Lord JS, Giblin SR, Tkachuk AM, Barbara B
Onset of Magnetic Correlations in LiY1-xHoxF4 with 0.002 <= x <= 0.05 Studied via MuSR
Journal of Physics: Conference Series **150**, 042044 (2009)

Hafliger P, Khasanov R, Lortz R, Petrovic A, Togano K, Baines C, Graneli B, Keller H
Muon-Spin Rotation Study of the Ternary Noncentrosymmetric Superconductors Li2Pd (x) Pt3-x B
Journal of Superconductivity And Novel Magnetism **22**, 337 (2009)

Hossain MD, Saadaoui H, Parolin TJ, Song Q, Wang D, Smadella M, Chow KH, Egilmez M, Fan I, Kiefl RF, Kreitzman SR, Levy CDP, Morris GD, Pearson MR, Salman Z, MacFarlane WA
The spin lattice relaxation of Li-8 in simple metals
PHYSICA B-CONDENSED MATTER **404**, 914 (2009)

Hossain MD, Salman Z, Wang D, Chow KH, Kreitzman S, Keeler TA, Levy CDP, MacFarlane WA, Miller RI, Morris GD, Parolin TJ, Pearson M, Saadaoui H, Kiefl RF
Low-field cross spin relaxation of Li-8 in superconducting NbSe2
Physical Review B **79**, 144518 (2009)

Ikdeo Y, Sugiyama J, Nozaki H, Mukai K, Itahara H, Russo PL, Andreica D, Amato A
High pressure mu SR study on cobalt oxide spinel
Physica B-Condensed Matter **404**, 652 (2009)

Ikedo Y, Sugiyama J, Nozaki H, Mukai K, Russo PL, Andreica D, Amato A, Ono Y, Kajitani T
mu SR study on CuCr1-xMgxO2
Physica B-Condensed Matter **404**, 645 (2009)

Ikedo Y, Sugiyama J, Nozaki H, Russo PL, Andreica D, Amato A, Mansson M, Shizuya M, Isobe M, Takayama-Muromachi E
Paramagnetic nature of the layered cobalt dioxide with a double rocksalt-type layer
Physica B-Condensed Matter **404**, 607 (2009)

Ito TU, Higemoto W, Ohishi K, Nishida N, Heffner RH, Aoki Y, Amato A, Onimaru T, Suzuki HS
Quantized Hyperfine Field at an Implanted mu(+) Site in PrPb3: Interplay between Localized f Electrons and an Interstitial Charged Particle
Physical Review Letters **102**, 096403 (2009)

Jarry A, Luetkens H, Pashkevich YG, Stingaciu M, Pomjakushina E, Conder K, Lemmens P, Klaus HH
Magnetic properties of the layered cobaltite NdBaCo2O5.50
Physica B-Condensed Matter **404**, 765 (2009)

Kawasaki Y, Minami T, Kishimoto Y, Ohno T, Koda A, Satoh KH, Kadono R, Gavilano JL, Luetkens H, Nakajima T, Ueda Y
Microscopic investigation of antiferromagnetic order in A-site-ordered perovskite manganite YBaMn2O6
Physica B-Condensed Matter **404**, 781 (2009)

Khasanov R, Bendele M, Amato A, Babkevich P, Boothroyd AT, Cervellino A, Conder K, Gvasaliya SN, Keller H, Klauss HH, Luetkens H, Pomjakushin V, Pomjakushina E, Roessli B
Coexistence of incommensurate magnetism and superconductivity in Fe(1+y)SexTe(1-x)
Physical Review B **80**, 140511 (2009)

Khasanov R, Evtushinsky DV, Amato A, Klauss HH, Luetkens H, Niedermayer C, Buchner B, Sun GL, Lin CT, Park JT, Inosov DS, Hinkov V
Two-Gap Superconductivity in Ba1-xKxFe2As2: A Complementary Study of the Magnetic Penetration Depth by Muon-Spin Rotation and Angle-Resolved Photoemission
Physical Review Letters **102**, 187005 (2009)

Khasanov R, Kondo T, Strassle S, Heron DOG, Kaminski A, Keller H, Lee SL, Takeuchi T
Zero-field superfluid density in a d-wave superconductor evaluated from muon-spin-rotation experiments in the vortex state
Physical Review B **79**, 180507 (2009)

Khasanov R, Maisuradze A, Maeter H, Kwadrin A, Luetkens H, Amato A, Schnelle W, Rosner H, Leithe-Jasper A, Klauss HH
Superconductivity and Field-Induced Magnetism in SrFe1.75Co0.25As2
Physical Review Letters **103**, 067010 (2009)

Kondo T, Khasanov R, Sassa Y, Bendounan A, Pailhes S, Chang J, Mesot J, Keller H, Zhigadlo ND, Shi M, Bukowski Z, Karpinski J, Kaminski A
Anomalous asymmetry in the Fermi surface of the high-temperature superconductor YBa2Cu4O8 revealed by angle-resolved photoemission spectroscopy
Physical Review B **80**, 100505 (2009)

Kondo T, Khasanov R, Takeuchi T, Schmalian J, Kaminski A
Competition between the pseudogap and superconductivity in the high-T-c copper oxides
Nature **457**, 296 (2009)

Liu C, Kondo T, Ni N, Palczewski AD, Bostwick A, Samolyuk GD, Khasanov R, Shi M, Rotenberg E, Bud'ko SL, Canfield PC, Kaminski A
Three- to Two-Dimensional Transition of the Electronic Structure in CaFe2As2: A Parent Compound for an Iron Arsenic High-Temperature Superconductor
Physical Review Letters **102**, 167004 (2009)

Luetkens H, Klauss HH, Kraken M, Litterst FJ, Dellmann T, Klingeler R, Hess C, Khasanov R, Amato A, Baines C, Kosmala M, Schumann OJ, Braden M, Hamann-Borrero J, Leps N, Kondrat A, Behr G, Werner J, Buchner B
The electronic phase diagram of the LaO1-xFxFeAs superconductor
Nature Materials **8**, 305 (2009)

Maeter H, Luetkens H, Pashkevich YG, Kwadrin A, Khasanov R, Amato A, Gusev AA, Lamonova KV, Chervinskii DA, Klingeler R, Hess C, Behr G, Buchner B, Klauss HH
Interplay of rare earth and iron magnetism in RFeAsO (R=La, Ce, Pr, and Sm): Muon-spin relaxation study and symmetry analysis
Physical Review B **80**, 094524 (2009)

Maisuradze A, Khasanov R, Shengelaya A, Keller H
Comparison of different methods for analyzing mu SR line shapes in the vortex state of type-II superconductors
Journal of Physics-Condensed Matter **21**, 075701 (2009)

Maisuradze A, Nicklas M, Gumeniuk R, Baines C, Schnelle W, Rosner H, Leithe-Jasper A, Grin Y, Khasanov R
Superfluid Density and Energy Gap Function of Superconducting PrPt4Ge12
Physical Review Letters **103**, 147002 (2009)

Maisuradze A, Shengelaya A, Kochelaev BI, Pomjakushina E, Conder K, Keller H, Muller KA
Probing the Yb3+ spin relaxation in Y0.98Yb0.02Ba2Cu3Ox by electron paramagnetic resonance
Physical Review B **79**, 054519 (2009)

Mamedov TN, Gorelkin VN, Gritsaj KI, Herlach D, Stoykov AV, Zimmermann U
Shallow acceptor impurities in diamond-like semiconductors studied by polarized negative muons
Physica B-Condensed Matter **404**, 808 (2009)

Manson JL, Schlueter JA, Funk KA, Southerland HI, Twamley B, Lancaster T, Blundell SJ, Baker PJ, Pratt FL, Singleton J, McDonald RD, Goddard PA, Sengupta P, Batista CD, Ding LT, Lee C, Whangbo MH, Franke I, Cox S, Baines C, Trial D
Strong H center dot center dot center dot F Hydrogen Bonds as Synthons in Polymeric Quantum Magnets: Structural, Magnetic, and Theoretical Characterization of [Cu(HF2)(pyrazine)(2)]SbF6, [Cu2F(HF)(HF2)(pyrazine)(4)](SbF6)(2), and [CuAg(H3F4)(pyrazine)(5)](SbF6)(2)
Journal of The American Chemical Society **131**, 6733 (2009)

Mansour AI, Morris GD, Salman Z, Chow KH, Dunlop T, Jung J, Fan I, MacFarlane WA, Kiefl RF, Parolin TJ, Saadaoui H, Wang D, Hossain MD, Song Q, Smadella M, Mosendz O, Kardasz B, Heinrich B, Levy CDP, Pearson MR
Cross-relaxation of Li-8(+) in copper
Physica B-Condensed Matter **404**, 910 (2009)

Mansour AL, Chow KH, Salman Z, Fan I, King PJC, Hitti B, Jung J, Cottrell SP
Can the dynamics and reactivity of Mu(+) and Mu(-) in heavily doped n-type and p-type silicon be studied?
Physica B-Condensed Matter **404**, 831 (2009)

Marcipar L, ofer O, Keren A, Nytko E, Nocera D, Lee Y, Helton J, Baines C
Muon-spin spectroscopy of the organometallic spin-1/2 kagome-lattice compound Cu(1,3-benzenedicarboxylate)
Physical Review B **80**, 132402 (2009)

McKenzie I, Dilger H, Hess S, Scheuermann R, Stoykov A, Roduner E
Azacyclohexadienyl radicals in pyridine and ZSM-5 silicalite
Physica B-Condensed Matter **404**, 638 (2009)

McKenzie I, Dilger H, Stoykov A, Scheuermann R
Muon Spin Spectroscopy of the Nematic Liquid Crystal 4-n-Pentyl-4 '-cyanobiphenyl (5CB)
Journal of Physical Chemistry B **113**, 10135 (2009)

Morenzoni E
A (closer) look below surfaces and at heterostructures with polarized muons
Physica B-Condensed Matter **404**, 577 (2009)

Mukai K, Sugiyama J, Ikedo Y, Russo PL, Andreica D, Amato A, Ariyoshi K, Ohzuku T
Micro- and macroscopic magnetism in LixNiO2
Journal of Power Sources **189**, 665 (2009)

Nakano T, Matsumoto J, Duan TC, Watanabe I, Suzuki T, Kawamata T, Amato A, Pratt FL, Nozue Y
Fast muon spin relaxation in ferromagnetism of potassium clusters in zeolite A
Physica B-Condensed Matter **404**, 630 (2009)

Ohishi K, Heffner RH, Spehling J, MacDougall GJ, Ito TU, Higemoto W, Amato A, Andreica D, Nieuwenhuys G, Klauss HH, Luke GM, Thompson JD, Bianchi AD, Fisk Z
Magnetism and superconductivity in heavy fermion superconductor CeCo(In0.97Cd0.03)(5)
Physica B-Condensed Matter **404**, 754 (2009)

Olariu A, Mendels P, Bert F, Alexander LK, Mahajan AV, Hillier AD, Amato A
Spin dynamics in Heisenberg triangular antiferromagnets: A mu SR study of LiCrO2
Physical Review B **79**, 224401 (2009)

Parolin TJ, Shi J, Salman Z, Chow KH, Dosanjh P, Saadaoui H, Song Q, Hossain MD, Kiefl RF, Levy CDP, Pearson MR, MacFarlane WA
Nuclear magnetic resonance study of Li implanted in a thin film of niobium
Physical Review B **80**, 174109 (2009)

Pomjakushina E, Conder K, Pomjakushin V, Bendele M, Khasanov R
Synthesis, crystal structure, and chemical stability of the superconductor FeSe1-x
Physical Review B **80**, 024517 (2009)

Popa AI, Vavilova E, Arango YC, Kataev V, Taschner C, Klauss HH, Maeter H, Luetkens H, Buchner B, Klingeler R
High-temperature ferromagnetism of Li-doped vanadium oxide nanotubes
EPL **88**, 57002 (2009)

Prokscha T, Morenzoni E, Eshchenko DG, Luetkens H, Nieuwenhuys GJ, Suter A
Near-surface muonium states in germanium
Physica B-Condensed Matter **404**, 866 (2009)

Prokscha T, Scheuermann R, Hartmann U, Raselli A, Suter A, Amato A, Nieuwenhuys GJ, Dijksmann A, Gartner F, Greuter U, Mutter S, Schlumpf N, Morenzoni E
A novel VME based mu SR data acquisition system at PSI
Physica B-Condensed Matter **404**, 1007 (2009)

Rotaru GM, Roessli B, Amato A, Gvasaliya SN, Mudry C, Lushnikov SG, Shaplygina TA
Spin-glass state and long-range magnetic order in Pb(Fe1/2Nb1/2)O-3 seen via neutron scattering and muon spin rotation
Physical Review B **79**, 184430 (2009)

Saadaoui H, MacFarlane WA, Morris GD, Salman Z, Chow KH, Fan I, Hossain MD, Liang R, Mansour AI, Parolin TJ, Smadella M, Song Q, Wang D, Kiefl RF
Vortex lattice disorder in YBa2Cu3O7-delta studied with beta-NMR
Physica B-Condensed Matter **404**, 730 (2009)

Saadaoui H, MacFarlane WA, Salman Z, Morris GD, Chow KH, Fan I, Fournier P, Hossain MD, Keeler TA, Kreitzman SR, Levy CDP, Mansour AI, Miller RI, Parolin TJ, Pearson MR, Song Q, Wang D, Kiefl RF
beta-NMR investigation of the vortex lattice near the interface of silver and Pr1.85Ce0.15CuO4-delta thin films
Physica B-Condensed Matter **404**, 727 (2009)

Saadaoui H, Macfarlane AW, Salman Z, Morris GD, Song Q, Chow KH, Hossain MD, Levy CDP, Mansour AI, Parolin TJ, Pearson MR, Smadella M, Wang D, Kiefl RF
Vortex lattice disorder in YBa2Cu3O7-delta probed using beta-NMR
Physical Review B **80**, 224503 (2009)

Saadaoui H, Morris GD, Chow KH, Hossain MD, Levy CDP, Parolin TJ, Pearson MR, Salman Z, Smadella M, Song Q, Wang D, Hentges PJ, Greene LH, Kiefl RF, MacFarlane WA
Search for time-reversal symmetry breaking order at the (110) interface of YBa2Cu3O7-delta using beta NMR
Physica B-Condensed Matter **404**, 724 (2009)

Salman Z, Baker PJ, Blundell SJ, Cottrell SP, Giblin SR, Hillier AD, Holsman BH, King PJC, Lancaster T, Lord JS, McKenzie I, Nightingale J, Pratt FL, Scheuermann R
HiFi-A new high field muon spectrometer at ISIS
Physica B-Condensed Matter **404**, 978 (2009)

Salman Z, Kiefl RF, Chow KH, MacFarlane WA, Keeler TA, Parolin TJ, Wang D
Local magnetic susceptibility of the muon in the S=1/2 V-15 molecular nano-magnet
Physica B-Condensed Matter **404**, 626 (2009)

Sanna S, De Renzi R, Lamura G, Ferdeghini C, Palenzona A, Putti M, Tropeano M, Shiroka T
Magnetic-superconducting phase boundary of SmFeAsO1-xFx studied via muon spin rotation: Unified behavior in a pnictide family
Physical Review B **80**, 052503 (2009)

Sedlak K, Scheuermann R, Stoykov A, Amato A
GEANT4 simulation and optimisation of the high-field mu SR spectrometer
Physica B-Condensed Matter **404**, 970 (2009)

Sedlak K, Shiroka T, Stoykov A, Scheuermann R
GEANT4 simulation of the upgraded ALC spectrometer
Physica B-Condensed Matter **404**, 974 (2009)

Shay M, Keren A, Koren G, Kanigel A, Shafir O, Marcipar L, Nieuwenhuys G, Morenzoni E, Suter A, Prokscha T, Dubman M, Podolsky D
Interaction between the magnetic and superconducting order parameters in a La1.94Sr0.06CuO4 wire studied via muon spin rotation
Physical Review B **80**, 144511 (2009)

Shiroka T, Prokscha T, Morenzoni E, Sedlak K
GEANT4 as a simulation framework in mu-SR
Physica B **404**, 966 (2009)

Smadella M, Salman Z, Chow KH, Egilmez M, Fan I, Hossain MD, Kiefl RF, Kreitzman SR, Levy CDP, MacFarlane WA, Mansour AI, Morris GD, Parolin TJ, Pearson M, Saadaoui H, Song Q, Wang D
Surface dependent structural phase transition in SrTiO3 observed with spin relaxation of Li-8
Physica B-Condensed Matter **404**, 924 (2009)

Song Q, Chow KH, Egilmez M, Fan I, Hossain MD, Kiefl RF, Kreitzman SR, Levy CDP, Morris GD, Parolin TJ, Pearson MR, Salman Z, Saadaoui H, Smadella M, Wang D, Ingle NJC, MacFarlane WA
Spin lattice relaxation of Li-8 in a ferromagnetic EuO epitaxial thin film
Physica B-Condensed Matter **404**, 619 (2009)

Song Q, Chow KH, Miller RI, Fan I, Hossain MD, Kiefl RF, Kreitzman SR, Levy CDP, Parolin TJ, Pearson MR, Salman Z, Saadaoui H, Smadella M, Wang D, Yu KM, Liu X, Furdyna JK, MacFarlane WA
Beta-detected NMR study of the local magnetic field in epitaxial GaAs:Mn
Physica B-Condensed Matter **404**, 892 (2009)

Storchak VG, Brewer JH, Arseneau DJ, Stubbs SL, Parfenov OE, Eshchenko DG, Morenzoni E, Aminov TG
Magnetic polaron bound to the positive muon in SmS: Exchange-driven formation of a mixed-valence state
Physical Review B **79**, 193205 (2009)

Storchak VG, Parfenov OE, Brewer JH, Russo PL, Stubbs SL, Lichti RL, Eshchenko DG, Morenzoni E, Aminov TG, Zlomanov VP, Vinokurov AA, Kallaher RL, Molnar SV
Direct observation of the magnetic polaron
Physical Review B **80**, 235203 (2009)

Storchak VG, Parfenov OE, Brewer JH, Russo PL, Stubbs SL, Lichti RL, Eshchenko DG, Morenzoni E, Cottrell SP, Lord JS, Aminov TG, Zlomanov VP, Vinokurov AA, Kallaher RL, von Molnar S
Electron localization into magnetic polaron in EuS
Physica B-Condensed Matter **404**, 896 (2009)

Storchak VG, Parfenov OE, Brewer JH, Russo PL, Stubbs SL, Lichti RL, Eshchenko DG, Morenzoni E, Zlomanov VP, Vinokurov AA, Bamburov VG
Novel muonium centers-magnetic polarons-in magnetic semiconductors
Physica B-Condensed Matter **404**, 899 (2009)

Stoykov A, Herlach D, Scheuermann R, Zimmermann U, Gritsay K, Mamedov T
Negative muon spin rotation study of acceptor centers in SiC
Physica B-Condensed Matter **404**, 824 (2009)

Stoykov A, Scheuermann R, Sedlak K
Fast timing detectors for high field mu SR spectrometers
Physica B-Condensed Matter **404**, 990 (2009)

Stoykov A, Scheuermann R, Sedlak K, Shiroka T, Zhuk V
A new detector system for the ALC spectrometer-First experience with G-APDs in mu SR instrumentation
Physica B-Condensed Matter **404**, 986 (2009)

Stoykov A, Scheuermann R, Sedlak K, Shiroka T, Zhuk V
First experience with G-APDs in muSR instrumentation
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **610**, 374 (2009)

Strassle S, Khasanov R, Kondo T, Heron DOG, Kaminski A, Keller H, Lee SL, Takeuchi T
Superfluid Density and Angular Dependence of the Energy Gap in Optimally Doped (BiPb)(2)(SrLa)(2)CuO6+delta
Journal of Superconductivity And Novel Magnetism **22**, 189 (2009)

Strassle S, Khasanov R, Kondo T, Heron DOG, Kaminski A, Keller H, Lee SL, Takeuchi T
Superfluid Density and Angular Dependence of the Energy Gap in Optimally Doped (BiPb)(2)(SrLa)(2)CuO6+delta
Journal of Superconductivity And Novel Magnetism **22**, 189 (2009)

Sugiyama J, Ikedo Y, Mukai K, Nozaki H, Russo PL, Ansaldo EJ, Brewer JH, Andreica D, Amato A
Microscopic magnetic nature of layered cobalt dioxides investigated by muon-spin rotation and relaxation
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **600**, 305 (2009)

Sugiyama J, Ikedo Y, Nozaki H, Mukai K, Andreica D, Amato A, Wenetrier M, Carlier D, Delmas C
Annihilation of antiferromagnetic order in LiCoO2 by excess Li
Physica B-Condensed Matter **404**, 769 (2009)

Sugiyama J, Ikedo Y, Nozaki H, Russo PL, Brewer JH, Ansaldo EJ, Morris GD, Chow KH, Andreica D, Amato A, Fujii T, Okada S, Terasaki I
Static magnetic order and anisotropy of the layered cobalt dioxides Bi1.6Pb0.4Sr2Co2Oy and Bi2Sr2Co2Oy
Physica B-Condensed Matter **404**, 773 (2009)

Sugiyama J, Mansson M, Ikedo Y, Goko T, Mukai K, Andreica D, Amato A, Ariyoshi K, Ohzuku T
mu+SR investigation of local magnetic order in LiCrO2
Physical Review B **79**, 184411 (2009)

Sugiyama J, Mukai K, Ikedo Y, Nozaki H, Russo PL, Andreica D, Amato A, Ariyoshi K, Ohzuku T
Static magnetic order on the triangular lattice in LixNiO2 with x <= 1
Physica B-Condensed Matter **404**, 663 (2009)

Sugiyama J, Nozaki H, Ikedo Y, Mukai K, Russo PL, Andreica D, Amato A, Yoshida H, Hiroi Z
Static magnetic order in metallic triangular antiferromagnet Ag2MnO2
Physica B-Condensed Matter **404**, 777 (2009)

Suzuki HS, Furubayashi T, Kawashima Y, Nagata S, Suzuki T, Kawamata T, Watanabe I, Matsuzaki T, Amato A
mu SR study of thiospinel CuCrZrS4
Physica B-Condensed Matter **404**, 649 (2009)

Wagner W, Seidel M, Morenzoni E, Groeschel F, Wohlmuther M, Daum M
PSI status 2008-Developments at the 590 MeV proton accelerator facility
Nuclear Instruments & Methods In Physics Research Section A-Accelerators Spectrometers Detectors And Associated Equipment **600**, 5 (2009)

Wang D, Salman Z, Chow KH, Fan I, Hossain MD, Keeler TA, Kiefl RF, Levy CDP, Mansour AI, Morris GD, Pearson MR, Parolin TJ, Saadaoui H, Smadella M, Song Q, MacFarlane WA
Nuclear spin relaxation/resonance of Li-8 in Al
Physica B-Condensed Matter **404**, 920 (2009)

Wojek BM, Morenzoni E, Eshchenko DG, Suter A, Prokscha T, Koller E, Treboux E, Fischer O, Keller H
Magnetism and superconductivity in cuprate heterostructures studied by low energy mu SR
Physica B-Condensed Matter **404**, 720 (2009)

de Visser A, Huy NT, Gasparini A, de Nijs DE, Andreica D, Baines C, Amato A
Muon Spin Rotation and Relaxation in the Superconducting Ferromagnet UCoGe
Physical Review Letters **102**, 167003 (2009)

CONFERENCE, WORKSHOP AND SEMINAR CONTRIBUTIONS

A. Amato
Interplay Magnetism-Superconductivity in UCoGe
Joint Users' Meeting @ PSI: JUMP '09, Paul Scherrer Institut, Villigen, Switzerland, 12.-13.10.2009

A. Amato
Interplay Magnetism-Superconductivity in UCoGe
Swiss Workshop on Materials with Novel Elcetronic Properties, Les Diablerets, Switzerland, 26-28, 08, 2009

H. Luetkens
Magnetism and Superconductivity in T'-$La_{2-x}Ce_xCuO_4$ Films
Joint Users' Meeting @ PSI: JUMP '09, Paul Scherrer Institut, Villigen, Switzerland, 12.-13.10.2009

H. Luetkens
Competition of Electronic Ground States in the Iron-Pnictide High-T_c Superconductors $ReO_{1x}F_xFeAs$
International Conference on the Application of the Mössbauer Effect, Vienna, Austria, 19-24.7.2009

H. Luetkens
Electronic Phase Diagram of $LaO_{1-x}F_xFeAs$: A Muon Spin Rotation Study
DPG Frühjahrstagung, Dresden, Germany, 22-27. 3. 2009

A. Maisuradze
μSR Investigation of superfluid density and energy gap-function of superconducting $PrPt_4Ge_{12}$
Joint Users' Meeting @ PSI: JUMP '09, Paul Scherrer Institut, Villigen, Switzerland, 12.-13.10.2009

E. Morenzoni, B.M. Wojek, A. Suter, I. Bozovic, G. Logvenov, T. Prokscha, H. Keller, Ø. Fischer
Diamagnetic Response in LSCO Heterostructures
2009 Swiss Workshop on Materials with Novel Electronic Properties, Les Diablerets, Switzerland, August 26-28, 2009

E. Morenzoni, B.M. Wojek, A. Suter, I. Bozovic, G. Logvenov, T. Prokscha, H. Keller, Ø. Fischer
Diamagnetic Response in LSCO Heterostructures
Joint Users' Meeting at PSI 2009, Villigen, Switzerland, October 12-13, 2009

E. Morenzoni, A. Suter, B.M. Wojek, E. Kirk, R.F. Kiefl, W.A. MacFarlane, G.D. Morris, W. Dong, D.G. Eshchenko, T. Prokscha, K.H. Chow, M.D. Hossain, T.J. Parolin, H. Saadaoui, M. Smadella, Q. Song
Local proximity studies of normal-superconductor bilayers by LE-µSR and β-NMR
Advanced Science Research Symposium 2009, Tokai, Japan, November 10-12, 2009

E. Morenzoni
Magnetism and superconductivity in cuprate heterostructures
MaNEP Forum workshop, Neuchatel, 19.1.2009

T. Prokscha, K. Chow, D. Eshchenko, H. Luetkens, E. Morenzoni, G. Nieuwenhuys, R. Scheuermann, Z. Salman, A. Suter
Low-energy µSR as a new local probe technique to study photo-induced phenomena in thin films and heterostructures
MaNEP Meeting, Les Diablerets, Switzerland, August 26-28, 2009

T. Prokscha, K. Chow, D. Eshchenko, H. Luetkens, E. Morenzoni, G. Nieuwenhuys, R. Scheuermann, Z. Salman, A. Suter
Low-energy µSR as a new local probe technique to study photo-induced phenomena in thin films and heterostructures
Joint Annual Meeting of SPG and ÖPG, Innsbruck, Austria, September 02-04, 2009

T. Prokscha, K. Chow, D. Eshchenko, H. Luetkens, E. Morenzoni, G. Nieuwenhuys, R. Scheuermann, Z. Salman, A. Suter
Low-energy µSR as a new local probe technique to study photo-induced phenomena in thin films and heterostructures
JUM@P Meeting, PSI, Switzerland, October 12-13, 2009

Z. Salman, S.J. Blundell, S.R. Giblin, M. Mannini, L. Margheriti, E. Morenzoni, T. Prokscha, A. Suter, A. Cornia, R. Sessoli
Proximal magnetometry of monolayers of single molecule magnets on gold using polarized muons
JUM@P Meeting, PSI, Switzerland, October 12-13, 2009

K. Sedlak
Geant4 Simulation of a muSR spectrometer
8th PSI Summer School on Condensed Matter Research, Zuoz, Switzerland, August 1.-7. 2009

A. Suter, E. Morenzoni, T. Prokscha, H. Luetkens, G.J. Nieuwenhuys, B.M. Wojek, I. Bozovic, G. Logvenov, A. Gozar
Magnetism and Interface-Superconductivityin La_2CuO_4 / $La_{1.56}Sr_{0.44}CuO_4$ *Superlattices*
MaNEP Meeting, Les Diablerets, Switzerland, August 26-28, 2009

A. Suter, E. Morenzoni, T. Prokscha, H. Luetkens, G.J. Nieuwenhuys, B.M. Wojek, I. Bozovic, G. Logvenov, A. Gozar
Magnetism and interface-superconductivity in metal-insulator $La_{2-x}Sr_xCuO_4$ *superlattices*
JUM@P Meeting, PSI, Switzerland, October 12-13, 2009

B.M. Wojek, E. Morenzoni, D.G. Eshchenko, T. Prokscha, A. Suter, E. Koller, E. Treboux, Ø. Fischer, and H. Keller
Superconductivity and Magnetism in Cuprate Heterostructures Studied by Low Energy µSR
DPG Frühjahrstagung der Sektion Kondensierte Materie (SKM), Dresden, Germany, March 22-27, 2009

INVITED TALKS

R. Khasanov
Magnetic and superconducting properties of Iron-based superconductors: A muon spin relaxation study

Swiss Workshop on Materials with Novel Electronic Properties
Les Diablerets, Switzerland, 26-28, 08, 2009

R. Khasanov
Pressure effect on superconductivity and magnetism of FeSe superconductor
The 9th International Conference on Materials and Mechanisms of Superconductivity (M2S-IX). Tokyo, Japan, September 7-12, 2009.

H. Luetkens
Electronic Phase Diagram of $LaO_{1-x}F_xFeAs$: A Muon Spin Rotation Study
Institut für Physik der Kondensierten Materie, TU Braunschweig, Germany, 15.5.2009

H. Luetkens
Magnetic and Superconducting Properties of Iron Pnictides
Laboratoire de Physique des Solides, Universite Paris-Sud, Orsay, France, 27.4.2009

H. Luetkens
Magnetic and Superconducting Properties of Iron Pnictides
XVth Workshop on Magnetism and Intermetallics, Lisbon, Portugal, 12-13.2.2009

E. Morenzoni
Depth dependent studies of magnetic and superconducting properties of thin films and heterostructures with polarized muons
31st International Symposium on the Dynamic Properties of Solids 17-9-2009, Antwerp, Belgium, **(invited)**

E. Morenzoni
Depth dependent studies of magnetic and superconducting properties of thin films and heterostructures with polarized muons
Condensed Matter Seminar, 2-9-2009, Brookhaven National Laboratory, **(invited)**

E. Morenzoni
Muons, slow muons and their physics prospects
European Spallation Source Symposium, 4-12-2009, Lund, Sweden, **(invited)**

T. Prokscha
SμS Aktivitäten
LAAW Meeting, PSI, Switzerland, June 05, 2009

Z. Salman
Single Molecule Magnets - From Bulk to Monolayers
SLS Symposium on Magnetism in reduced dimension, PSI, Switzerland, March 3, 2009

R. Scheuermann
High Magnetic Field μSR Project
16th International Magnetic Measurement Workshop, PSI, Villigen, Switzerland, October 26-29, 2009

R. Scheuermann
High Magnetic Field μSR Project
Joint Users' Meeting @ PSI: JUMP '09, Paul Scherrer Institut, Villigen, Switzerland, 12.-13.10.2009

K. Sedlak
Simulations for the ALC upgrade and the high-field instrument at PSI
NMI3 Launch meeting, PSI, Villigen, Switzerland, March 30-31, 2009

K. Sedlak
Status of the Geant4 Simulations
High-Field Meeting, PSI, Villigen, Switzerland, November 6 2009

A. Stoykov
Application of G-APDs in Muon Spin Spectroscopy
Workshop on Avalanche Micro-Pixel Photo-Diodes for Frontier Detector Systems,
GSI, Darmstadt, Germany, February 9-10, 2009

A. Stoykov
Fast timing detectors for operation in high magnetic fields
NMI3 Launch meeting, PSI, Villigen, Switzerland, March 30-31, 2009

A. Suter
Muon Spin Rotation
PSI Summer School on Condensed Matter Research, Zuoz, Switzerland, Aug. 5, 2009

LECTURES AND COURSES

H. Luetkens
Physiker-Lego für künftige Technologien - Neue Phänomene in mikroskopischen Dimensionen
Forschung live erleben, Paul Scherrer Institut, Villigen, Switzerland, 7.10.2009

E. Morenzoni,
Physik mit Myonen: von der Atomphysik zur Festkörperphysik, Vorlesungen und Übungen
ETH Zürich, FS-2009

E. Morenzoni,
Praktikum: Myon Spin Rotationsspektroskopie
ETH Zürich, FS-2009

A. Suter
Physiker-Lego für künftige Technologien - Neue Phänomene in mikroskopischen Dimensionen
Forschung live erleben, Paul Scherrer Institut, Villigen, Switzerland, Oct. 7, 2009

MEMBERSHIP IN EXTERNAL COMMITTEES

A. Amato
- Member of the Material and Life Science Program Advisory Committee
- (ML-PAC) of the RIKEN Nishina Center for Accelerator Based Science

H. Luetkens
- Executive committee member of the International Society for µSR Spectroscopy (ISMS)

R. Scheuermann
- ISIS Facility Access Panel

Condensed Matter Research with Neutrons and Muons

Laboratory of Development and Methods (LDM)

LIST OF PUBLICATIONS (PEER REVIEWED)

Alfonsov A, Vavilova E, Kataev V, Buechner B, Podlesnyak A, Russina M, Furrer A, Straessle T, Pomjakushina E, Conder K, Khomskii DI
Origin of a spin-state polaron in lightly hole doped LaCoO3
Journal of Physics: Conference Series **150**, 042003 (2009)

P. Andreasson, M. Janousch, U. Staub, T. Todorova, B. Delley, G. I. Meijer, E. Pomjakushina
Detecting oxygen vacancies in $SrTiO_3$ by 3d transition-metal tracer ions
Phys. Rev. B **80**, 212103 (2009)

A. Anghel, F. Atchison, B. Blau, B. van den Brandt, M. Daum, R. Doelling, M.Dubs, P.-A.Duperrex, A.Fuchs, D.George, L.Göltl, P.Hautle, G.Heidenreich, F.Heinrich, R.Henneck, S. Heule, Th.Hofmann, St.Joray, M.Kasprzak, K.Kirch, A.Knecht, J.A.Konter, T.Korhonen, M. Kuzniak, B.Lauss, A.Mezger, A.Mtchedlishvili, G.Petzoldt, A.Pichlmaier, D.Reggiani, R. Reiser, U.Rohrer, M.Seidel, H.Spitzer, K.Thomsen, W.Wagner, M.Wohlmuther, G. Zsigmond, J.Zuellig, K.Bodek, S.Kistryn, J.Zejma, P.Geltenbort, C.Plonka, S.Grigoriev
The PSI Ultra-Cold Neutron Source
Nuclear Instrument And Methods A **611**, 272b (2009)

F. Atchison, B. Blau, K. Bodek, B. van den Brandt, T. Brys, M. Daum, P. Fierlinger, A. Frei, P. Geltenbort, P. Hautle, R. Henneck, S. Heule, A. Holley, M. Kasprzak, K. Kirch, A. Knecht, J.A. Konter, M. Kuzniak, C.-Y. Liu, C. L. Morris, A. Pichlmaier, C. Plonka, Y. Pokotilovski, A. Saunders, Y. Shin, D. Tortorella, M. Wohlmuther, A. R. Young, J. Zejma, G. Zsigmond
Investigation of Solid Solid D_2, O_2, and CD_4 for Ultracold Neutron Production
Nuclear Instrument And Methods A **611**, 252 (2009)

V. Bobrovskii, V. Kazantsev, A. Mirmelstein, N. Mushnikov, N. Proskurnina, V.Voronin, E. Pomjakushina, K. Conder, A.Podlesnyak
Spontaneous and field induced magnetic transitions in $YBaCo_2O_{5.5}$
Journal of Magnetism and Magnetic Materials, **321,** 429 (2009)

Braun A, Zhang X, Sun Y, Mueller U, Liu Z, Erat S, Ari M, Grimmer H, Mao SS, Graule T
Correlation of high temperature x-ray photoemission valence band spectra and conductivity in strained LaSrFeNi oxide on SrTiO3(110)
Applied Physics Letters **95**, 022107 (2009)

I. Cabrera, M. Kenzelmann, G. Lawes, Y. Chen, W.C. Chen, R. Erwin, T.R. Gentile, J.B. Leao, J.W. Lynn, N. Rogado, R.J. Cava, C. Broholm
Coupled magnetic and ferroelectric domains in multiferroic $Ni_3V_2O_8$
Phys. Rev. Lett. **103**, 087201 (2009)

S. Chakravarty, E. Huger, H. Schmidt, M. Horisberger, J. Stahn, N. P.Lalla
Determination of volume self-diffusivities in ultratine-grained metals using neutron reflectometry
Scripta Materialia **61**, 1117 (2009)

Chakravarty S, Gupta M, Gupta A, Rajagopalan S, Balamurugan AK, Tyagi AK, Deshpande UP, Horisberger M, Gutberlet T
Fe and N self-diffusion in amorphous FeN: A SIMS and neutron reflectivity study
Acta Materialia **57**, 1263 (2009)

D. Chernyshov, G. Rozenberg, E. Greenberg, E. Pomyakushina, V. Dmitriev
Pressure-Induced Insulator-to-Metal Transition in $TbBaCo_2O_{5.48}$
Phys. Rev. Lett. **103**, 125501 (2009)

D. Di Castro, R. Khasanov, A. Shengelaya, K. Conder, D. J. Jang,M. S. Park M, S-I Lee, H. Keller
Comparative study of the pressure effects on the magnetic penetration depth in electron- and hole-doped cuprate superconductors
J. Phys. Cond. Mat. **21**, 275701 (2009)

A. Dönni, H. Kitazawa, L. Keller, P. Fischer, P. Javorsky, F. Fauth, M. Zolliker
Determination of Frustrated and Non-Frustrated Magnetic Structures of Hexagonal and Orthorhombic TbPdAl
Journal of Alloys And Compounds **477**, 16 (2009)

F. X. Gallmeier, M. Wohlmuther, U. Filges, D. Kiselev, G. Muhrer
Implementation of Neutron Mirror Modeling Capability into MCNPX and Its Demonstration in First Applications
Nuclear Technology **168**, 768-772, (2009)

M. García-Fernández, U. Staub, Y. Bodenthin, V. Scagnoli, V. Pomjakushin, S.W. Lovesey, A. Mirone. J. Herrero-Martı´n, C. Piamonteze, E. Pomjakushina
Orbital Order at Mn and O Sites and Absence of Zener Polaron Formation in Manganites
Phys. Rev. Lett. **103**, 097205 (2009)

Grimmer H
Comments on tables of magnetic space groups
Acta Crystallographica Section A **65**, 145 (2009)

V.A. Ivanshin, I.N. Kurkin, E. Pomjakushina
Electron paramagnetic resonance of Ce^{3+} *and* Nd^{3+} *impurity ions in* $YBa_2Cu_3O_{6.13}$
Physics of the Solid State **51**, 322 (2009)

A. Jarry, H. Luetkens, Y.G. Pashkevich, M. Stingaciu, E. Pomjakushina, K.Conder, P.Lemmens, H.-H.Klaus
Magnetic properties of the layered cobaltite $NdBaCo_2O_{5.50}$
Physica B **404**, 765 (2009)

T.B.S. Jensen, N.B. Christensen, M. Kenzelmann, H.M. Ronnow, C. Niedermayer, N.H. Andersen, K. Lefmann, M. Jimenez-Ruiz, F. Demmel, J. Li, J.L. Zarestky, D. Vaknin
Anomalous spin waves and the commensurate-incommensurate magnetic phase transition in $LiNiPO_4$
Phys. Rev. B **79**, 092413 (2009)

T.B.S. Jensen, N.B. Christensen, M. Kenzelmann, H.M. Ronnow, C. Niedermayer, N.H. Andersen, K. Lefmann, J. Schefer, M.. Zimmermann, J. Li, J. L. Zarestky, D. Vaknin
Field-induced competing interactions and ferroelectric polarization in $LiNiPO_4$
Phys. Rev. B **79**, 092412 (2009)

R. Khasanov, M. Bendele, A. Amato, P. Babkevich, A. T. Boothroyd, A. Cervellino, K. Conder, S. N. Gvasaliya, H. Keller, H.-H. Klauss, H. Luetkens, V. Pomjakushin, E. Pomjakushina, B. Roessli
Coexistence of incommensurate magnetism and superconductivity in $Fe_{1+y}Se_xTe_{1-x}$
Phys. Rev. B **80**, 1(R) (2009)

K. Lefmann, P. K. Willendrup, L. Udby, B. Lebech, K. Mortensen, J. O. Birk, K. KlenØ, E. Knudsen, P. Christiansen, J. Saroun, J. Kulda, U. Filges, M. Konnecke, P. Tregenna-Piggott, J. Peters, K. Lieutenant, G. Zsigmond, P. Bentley, E. Farhi
Virtual experiments: the ultimate aim of neutron ray-tracing simulations
Journal of Neutron Research **16**, 97-111, (2008)

A. Maisuradze, A. Shengelaya, B. I. Kochelaev, E. Pomjakushina, K. Conder, H. Keller, K. A. Müller
Probing the Yb^{3+} spin relaxation in $Y_{0.98}Yb_{0.02}Ba_2Cu_3O_x$ by electron paramagnetic resonance
Phys. Rev. B **79,** 054519 (2009)

M. Medarde, C. Dallera, M. Grioni, B. Delley, F. Vernay, J.Mesot, M. Sikora, J.A. Alonso, M.J. Martínez-Lope
Charge disproportionation in $RNiO_3$ perovskites (R = rare earth) from high-resolution x-ray absorption spectroscopy Phys
Rev. B **80**, 245105 (2009)

A. M. Mulders, S. M. Lawrence, U. Staub, M. Garcia-Fernandez, V. Scagnoli, C. Mazzoli, E. Pomjakushina. K. Conder, Y. Wang
Direct Observation of Charge Order and an Orbital Glass State in Multiferroic $LuFe_2O_4$
Phys. Rev. Lett. **103**, 077602 (2009)

J. Mustre de León, M. Acosta-Alejandro, M. Medarde, P.A. Montano
X- absorption at the Pr L1-edge in $PrNiO_3$ J. Supercond
Nov. Magn. **22**, 81 (2009)

A. Paduan-Filho, K.A. Al-Hassanieh, P. Sengupta, V.S. Zapf, M. Jaime, A. Lacerda, M. Kenzelmann
Critical behavior of the magnetization in the spin-gapped system $NiCl_2$-$4SC(NH_2)_2$,
J. Appl Phys. **105**, 07D501 (2009)

F.M. Piegsa, B. van den Brandt, P. Hautle, J. Kohlbrecher, J.A. Konter
Quantitative Radiography of Magnetic Fields using Neutron Spin Phase Imaging
Phys. Rev. Lett. **102**, 45501 (2009)

F.M. Piegsa
Highly Collimating Neutron Optical Devices
Nuclear Instrument and Methods A **603**, 401 (2009)

F.M. Piegsa, B. van den Brandt, P. Hautle, J.A. Konter
A Compact Neutron Ramsey Resonance Apparatus for Polarised Neutron Radiography
Nuclear Instrument and Methods A **605**, 5 (2009)

E. Pomjakushina, K. Conder, V. Pomjakushin, M. Bendele, and R. Khasanov
S*ynthesis, crystal structure, and chemical stability of the superconductor $FeSe_{1-x}$*
Phys. Rev. B **80** (2009) 024517

V. Pomjakushin, M. Kenzelmann, A. Dönni, A.B. Harris, T. Nakajima, S. Mitsuda, M. Tachibana, L. Keller, J. Mesot, H. Kitazawa, E. Takayama-Muromachi
Evidence for large electric polarization from collinear magnetism in $TmMnO_3$
New Journal of Physics **11**, 043019 (2009)

J. Rasch, D. Sheptyakov, J. Schefer, L. Keller, M. Boehm, F. Gozzo, N.V. Volkov, K. A. Sablina, G.A. Petrakovskii, H. Grimmer, K. Conder, J. F. Loffler
Structural properties of $Pb_3Mn_7O_{15}$ determined from high-resolution synchrotron powder diffraction
J. Solid State Chem. **182**, 1188 (2009)

A. Schilling, R. Dell'Amore, J Karpinski, Z. Bukowski, M. Medarde, E. Pomjakushina, K A. Müller
$LaBaNiO_4$: a Fermi glass
J. Phys.: Condens. Matter **21,** 015701 (2009)

M. Schneider, J. Stahn, P. Böni
Focusing of cold neutrons: Performance of a laterally graded and parabolically bent multilayer for Scattering Methods
Nuclear Instruments and Methods in Physics Research Section A **610**, 530-533 (2009)

E. Siranidi, D. Lampakis D, E. Liarokapis E, C. Panagopoulos, K. Conder
Doping and temperature dependence of inversion symmetry breaking in $La_{2-x}Sr_xCuO_4$
Physica C **469**, 760, (2009)

U. Staub, M. García-Fernández, Y. Bodenthin, V. Scagnoli, R. A. De Souza,
M. Garganourakis, E. Pomjakushina, K. Conder
Orbital and magnetic ordering in $Pr_{1-x}Ca_xMnO_3$ *and* $Nd_{1-x}Sr_xMnO_3$ *manganites near half doping studied by resonant soft x-ray powder diffraction*
Phys. Rev. B **79,** 224419 (2009)

N. Tsyrulin, T. Pardini, R.R.P. Singh, F. Xiao, P. Link, A. Schneidewind, A. Hiess,
C. P. Landee, M. M. Turnbull, M. Kenzelmann
Quantum effects in a S=1/2 two-dimensional Heisenberg antiferromagnet in an applied magnetic field
Phys. Rev. Lett. **102**, 197201 (2009)

R.B. Van Heeswijk, K. Uffmann, A. Comment, F. Kurdzesau, C. Perazzolo, C. Cudalbu, S. Janin,
J.A. Konter, P. Hautle, B. van den Brandt, G. Navon, J.J. Van Der Klink, R. Gruetter
Hyperpolarized Lithium-6 as a Sensor of Nanomolar Contrast Agents
Magnetic Resonance in Medicine **61**, 1489 (2009)

B. van den Brandt, H. Glättli, P. Hautle, J.A. Konter, F.M. Piegsa, O. Zimmer
The Measurement of the Incoherent Neutron Scattering Length of the Deuteron
Nuclear Instrument and Methods A **611**, 231 (2009)

Van den Brandt B, Hautle P, Konter JA, Piegsa FM, Urrego-Blanco JP
Dilution refrigerators for particle physics experiments: two variants with sample cooling By helium-4
JOURNAL OF PHYSICS: CONFERENCE SERIES **150**, 012024 (2009)

P. R. Vasos, A. Comment, R. Sarkar, P. Ahuja, S. Jannin, J.-P. Ansermet, J. A. Konter,
P. Hautle, B. van den Brandt, and G. Bodenhausen
Long-Lived States to Sustain Hyperpolarized Magnetization
Proceedings of the National Academy of Sciences of the USA **106**, 18469-18473 (2009)

Zolliker M, Kenzelmann M
High Magnetic Fields and Low Temperatures for Neutron Scattering Experiments at SINQ
NEUTRON NEWS **20 (3)**, 9 (2009)

LIST OF PUBLICATIONS (NOT PEER REVIEWED)

I. Cabrera, M. Kenzelmann, G. Lawes, Y. Chen, W.C. Chen, R. Erwin, T.R. Gentile, J. Leao,
J.W. Lynn, N. Rogado, R.J. Cava, C. Broholm
Electric field controlled magnetism
Annual Report of the NIST Center for Neutron Research (2008)

M. Kenzelmann, M. Zolliker, Th. Strässle, C. Niedermayer, B. Padmanabhan, M. Sigrist,
A.D. Bianchi, R. Movshovich, E.D. Bauer, J.L. Sarrao, J.D. Thompson
Conspiring magnetic and superconducting order
Annual Report PSI (2008)

J. Kreisel, M. Kenzelmann
Multiferroics – the challenge of coupling magnetism and ferroelectricity
Europhysics News **40**, 17 (2009)

Th. Strässle, B. Padmanabhan, C. Niedermayer, M. Kenzelmann, S. Klotz, N. Rogado, R.J. Cava, Th. Wolf
Removing frustration with pressure
Annual Report PSI (2008)

N. Tsyrulin, T. Pardini, R. Singh, F. Xiao, C. Landee, M. Turnbull, P. Link, A. Schneidewind, A. Hiess, M Kenzelmann
Quantum Effects in a Weakly-Frustrated S=1/2 Two-Dimensional Square-Lattice Antiferromagnet in Zero and Applied Magnetic Field
ILL annual report 2009

CONFERENCE, WORKSHOP AND SEMINAR CONTRIBUTIONS

K. Conder, E. Pomjakushina
Crystal growth of complex oxides by Traveling Floating Zone Method: recent results
MaNEP Neuchatel, 22.01.2009, **Talk**

K.Conder
Cobalt spin state related properties in cubic and layered cobaltites
Perovskite Meeting EMPA Dübendorf, 26.03.2009, **Talk**

U. Filges, G. Zsigmond, Th. Straessle
Characterization of the FOCUS monochromator by measurements and Monte Carlo simulations
ICNS, May 3 - 7, 2009, Knoxville, USA, **Talk**

U. Filges, R. Ackermann, P. Allenspach , M. Schneider, J. Stahn, A. Bollhalder, L. Holitzner, P. Keller, M. Horisberger
Validation of the HYSPEC supermirror analyzer prototype with Monte Carlo simulations
ICNS, May 3 - 7, 2009, Knoxville, USA, **Talk**

U. Filges, R. Ackermann, M. Schneider, J. Stahn, L. Holitzner, Th. Straessle, J. P. Embs, R. Hempelmann
A wedge-shaped polarizing analyzer for the TOF spectrometer FOCUS - Ray-trace MC simulations and experiments
DPG Conference, 8-12 March 2009, Hannover, Germany, **Talk**

J. Gironnet, P. de Marcillac, N. Coron, T. Redon, B. van den Brant, P. Hautle, J.A. Konter, U. Filges
Fast neutron spectroscopy with ^{6}LiF bolometers for background reduction in dark matter detection experiments
28 Oct 2009, IAS, Orsay, **Seminar**

J. Gironnet, B. van den Brandt, N. Coron, P. Hautle, U. Filges, J.A. Konter, P. de Marcillac, Y. Ortigoza, J.Puimedon, T. Rolon, L. Torres
Neutron spectroscopy with ^{6}LiF bolometers
13th International Workshop on Low Temperature Detectors, July 20-24, 2009, Stanford, UK, **Talk**

M. Kenzelmann
Multiple-order phases in materials close to a quantum critical point
Materials Physics & Applications Division, Los Alamos National Laboratory (16 February 2009), **Seminar**

M. Kenzelmann
Coupled magnetic and superconducting order in $CeCoIn_5$
Meeting of MaNEP, Neuchatel (19 Jan 2009), **Talk**

M. Kenzelmann
Ultra-fast spectroscopy & multiferroics
Swiss Workshop on Materials with Novel Electronic Properties, Les Diablerets (27 Aug 2009), **Session Chair**

M. Kenzelmann
International Conference on Neutron & X-ray Scattering
Kuala Lumpur (29 June 2009), **Session Chair**

M. Könnecke
State of NeXus
ICAT Developers Meeting, Abingdon, UK, 25-26 August (2009), **Talk**

M. Medarde, M.T. Fernández-Díaz, P. Lacorre, C. Dallera, M. Grioni, B. Delley, F. Vernay, J. Mesot, M.J. Martínez-Lope, J.A. Alonso
Gap opening through Ni^{3+} charge disproportionation in $RNiO_3$ perovskites (R = rare earth): a combined neutron diffraction and x-ray absorption study
2009 Swiss Workshop on Materials with Novel Electronic Properties, Les Diablerets, Switzerland, (26-28)-8-2009, **Poster**

M. Medarde, M.T. Fernández-Díaz, P. Lacorre, C. Dallera, M. Grioni, B. Delley, F. Vernay, J. Mesot, M.J. Martínez-Lope, J.A. Alonso
Ni^{3+d} / Ni^{3-d} charge fluctuations in the metallic state of $RNiO_3$ perovskites
7th Workshop on Orbital Physics and Novel Phenomena in Transition Metal Oxides, Berlin, Germany, (7-8)-10-2009, **Poster**

E. Pomjakushina, K. Conder, V. Pomjakushin, M. Bendele, R. Khasanov
Synthesis, crystal structure and chemical stability of the superconductor $FeSe_{1-x}$
Swiss Workshop on Materials with Novel Electronic Properties, September 2009, Les Diablerets, **Poster**

E. Pomjakushina, K. Conder, V. Pomjakushin, M. Bendele, R. Khasanov
Synthesis, crystal structure and chemical stability of the superconductor $FeSe_{1-x}$
1st Joint User Meeting, Oct 12-13 2009, PSI, Switzerland, **Poster.**

M. Schneider
High Performance Supermirrors on Metallic Substratess
ICNS 09, May 4.-7., 2009, Knoxville, USA. **Poster**

M. Schneider
High Performance Supermirrors on Metallic Substrates
NDS workshop, ILL Grenoble, July 1.-3. 2009, **Talk**

M. Schneider
High Performance Supermirrors on Metallic Substrates
Swiss Workshop on Materials with Novel Electronic Properties, September 2009, Les Diablerets, **Poster**

B. van den Brandt, P. Hautle, J.A. Konter, F.M. Piegsa, J.P. Urrego-Blanco
Dilution refrigerators for particle physics experiments: two variants with sample cooling by helium-4
J. Phys. **150** 012024 (2009), **Talk**

INVITED TALKS 2009

K. Conder, E. Pomjakushina, M. Stingaciu, A. Podlesnyak
Crystal growth, structural and magnetic properties of cubic and layered cobaltites
17th American Conf. on Crystal Growth and Epitaxy (ACCGE-17), Lake Geneva Wisconsin, (9-14 August 2009)

U. Filges, R. Ackermann,P. Allenspach , M. Schneider, J. Stahn, A. Bollhalder, L. Holitzner, P. Keller, M. Horisberger
A Supermirror Polarization Analyzer System for FOCUS and HYSPEC
WINS 2009, 1-2 May, 2009 , Oak Ridge, USA

M. Kenzelmann
Coupled magnetic and superconducting order in $CeCoIn_5$
International Symposium on Novel Spin Pairing, Kyoto (14 September 2009)

M. Kenzelmann
Coupled magnetic and superconducting order in $CeCoIn_5$
Conference on Quantum Criticality and Novel Phases, Dresden (3 August 2009)

M. Kenzelmann
Ferroelectricity from magnetic order
International Conference on Neutron & X-ray Scattering, Kuala Lumpur (30 June 2009)

M. Kenzelmann
Coupled magnetic and superconducting order in $CeCoIn_5$
Gordon Conference Superconductivity, Hong Kong (10 June 2009)

M. Kenzelmann
Ferroelectricity from magnetic order
The British Crystallographic Association Spring Meeting 2008, York (21 April 2009)

M. Kenzelmann
Ferroelectricity from magnetic order
APS March Meeting, Pittsburgh (17 March 2009)

LECTURES AND COURSES 2009

K. Conder
Keramik II (Semesterprogramm 327-0603-00)
Fakultät Werkstoffe ETH Zürich, (zusammen mit Prof. L. Gauckler), 25 Studenten

U. Filges
McStas workshop on Grid
22-26 June 2009, Kuala Lumpur, Malaysia

M. Kenzelmann
Lecture, *Magneto-electric multiferroics,*
Summer School on Magnetism and Superconductivity, Höör, Sweden (18 August 2009).

MEMBERSHIP IN EXTERNAL COMMITTEES

U. Filges
- Member of McStas developer group

M. Kenzelmann
- Forum of the CH-NCCR/NSF Materials with Novel Electronic Properties (MaNEP), Swiss National Science Foundation
- Member of the organizing committee, Summer School on Condensed Matter Research, Zuoz, Switzerland
- Member at large, Executive Committee of NIST Center for Neutron Research User Group
- Board Member, Swiss Neutron Scattering Society
- Beam Time Committee, FRM2 Neutron User Facility, Garching, Germany
- Search Committee for a Professor for nanoscale multifunctional ferroic materials and components, ETH Zürich
- Advisory Board, Physical Phenomena at High Magnetic Fields (PPHMF-VII), Tallahassee, Florida (2010)
- International Advisory Board of CIMTEC 2010, Montecatini Terme, Italy (2010)
- Ph.D. Examiner, University College London

M. Könnecke
- NeXus International Advisory Committe (since 2003)
- NOBUGS International Advisory Committee (Head, since 2006)
- PANDATA European Network, since 2009

M. Medarde
- ESS-PP preparatory phase (9 meetings in 2009 throughout Europe)

AWARDS

F.M. Piegsa
PSI Medal for most outstanding thesis work in 2007-2009, July 2009

DISSERTATIONS

J. Gironnet
Spectroscopie de neutrons rapide par bolomètres à cibles lithium pour la réduction du fond des expériences de détections direct de la matière noire
In preparation, (collaboration PSI-Orsay, Paris)

F. Kurdzesau
Some methods of dynamic nuclear polarization for use in metabolic imaging
Thèse № 4330 (2009), présentée le 3 Février 2009 École polytechnique fédérale de Lausanne (collaboration PSI-EPFL)

M. Stingaciu
“Synthesis, crystal growth and investigation of layered cobaltites type RBaCo2O5+d”
Thesis presented 15th May 2009 at Technischer Universität Carolo-Wilhelmina, Fakultät Elektrotechnik, Informationstechnik, Physik

F. Piegsa
Neutron spin precession in samples of polarised nuclei and neutron spin phase imaging
Thesis presented 13th July 2009, Physik-Department, Technische Universität München (collaboration PSI-TU München-Saclay)

J.P. Urrego-Blanco
Studies on a polarized proton target for reactions with radioactive ion beams
Thesis presented in August 2009, Physics department, The University of Tennessee, Knoxville (collaboration PSI-ORNL-U Tennessee)

LIST OF PUBLICATIONS 2009

Biomolecular Research

University level and other teaching

K. Ballmer-Hofer
Molecular Virology
Biozentrum, University of Basel, Switzerland, HS 2009

K. Ballmer-Hofer
Hypoxia signaling in angiogenesis, applications in tumor therapy
Cencer Networt, ETH Zürich and University of Zurich, Switzerland, March 2009

G. Capitani
Introduction to Bioinformatics Concepts and Applications
ETHZ, HS 2009

R. Jaussi
Gentechnik for students in medicine
University of Zurich, FS 2009

R. Jaussi
"Molekulare Zellbiologie" for students in life sciences
University of Zurich, HS 2009

F.K. Winkler
Grundlagen der Biologie I
ETH Zürich, FS 2009

F.K. Winkler
Molecular Biology and Biophysics III: Proteins: Structure, Function and Engineering
ETH Zürich, HS 2009

Publications

P. Berger, K. Tersar, K. Ballmer-Hofer, U. Suter
The CMT4B disease-causing proteins MTMR2 and MTMR13/SBF2 regulate AKT signaling
J Cell Mol Med., PMID: 19912440 (2009)

C. Bieniossek, Y. Nie, D. Frey, N. Olieric, C. Schaffitzel, I. Collinson, C. Romier, P. Berger, T.J. Richmond, M.O. Steinmetz, I. Berger
Automated unrestricted multigene recombineering for multiprotein complex production
Nat. Methods 6, 447 – 450 (2009)

C.O. De Groot, I. Jelesarov, F.F. Damberger, S. Bjelic, M.A. Schaerer, N.S. Bhavesh, I. Grigoriev, R.M. Buey, K. Wuthrich, G. Capitani, A. Akhmanova, M.O. Steinmetz
Molecular insights into mammalian end binding protein heterodimerization
J Biol Chem., PMID: 20008324 (2009)

D. Dell'Era Dosch, K. Ballmer-Hofer
Transmembrane domain-mediated orientation of receptor monomers in active VEGFR-2 dimers
FASEB J., PMID: 19726758 (2009)

A. Friedli, E. Fischer, I. Novak-Hofer, S. Cohrs, K. Ballmer-Hofer, P.A. Schubiger, R. Schibli, J. Grünberg
The soluble form of the cancer-associated L1 cell adhesion molecule is a pro-angiogenic factor
Int. J. Biochem. Cell Biol. 41, 1572 – 1580 (2009)

F.S. Grünewald, A.E. Prota, A. Giese, K. Ballmer-Hofer
Structure-function analysis of VEGF receptor activation and the role of coreceptors in angiogenic signaling
Biochim Biophys Acta, PMID: 19761875 (2009)

H. Gut, P. Dominici, S. Pilati, A. Astegno, M.V. Petoukhov, D.I. Svergun, M.G. Grütter, G. Capitani
A common structural basis for pH- and calmodulin-mediated regulation in plant glutamate decarboxylase
J Mol Biol. 392, 334 – 351 (2009)

S. Honnappa, S. Montenegro Gouveia, A. Weisbrich, F.F. Damberger, N.S. Bhavesh, H. Jawhari, I. Grigoriev, F.J.A. van Rijssel, R.M. Buey, A. Lawera, I. Jelesarov, F.K. Winkler, K. Wüthrich, A. Akhmanova, M.O. Steinmetz
An EB1-binding motif acts as a microtubule tip localization signal
Cell 138, 366 – 376 (2009)

Y. Komarova, C.O. De Groot, I. Grigoriev, S. Montenegro Gouveia, L. Munteanu, J.M. Schober, S. Honnappa, R.M. Buey, C.C. Hoogenraad, M. Dogterom, G.G. Borisy, M.O. Steinmetz, A. Akhmanova,
Mammalian EB proteins control persistent microtubule growth
J. Cell Biol. 184, 691 – 706 (2009)

Leppänen,V.-M., Prota,A.E., Jeltsch,M., Anisimov,A., Kalkkinen,N., Strandin,T., Lankinen,H., Goldman,A., Ballmer-Hofer,K. and Alitalo,K. Structural determinants of growth factor binding and specificity by VEGF receptor 2
Proc. Natl. Acad. Sci. USA, PMID: 20145116 (2009)

X.-D. Li, L.F. Huergo, A. Gasperina, F. O. Pedrosa, M. Merrick, F. K. Winkler
Crystal structure of dinitrogenase reductase activating glycohydrolase (DRAG) reveals conservation in the ADP-ribosylhydrolase fold and specific features in the ADP-ribose binding pocket
J Mol Biol. 390, 737 – 746 (2009)

G.M. Lingaraju, A.E. Prota, F.K. Winkler
Mutational studies of Pa-AGOG DNA glycosylase from the hyperthermophilic crenarchaeon Pyrobaculum aerophilum
DNA Repair (Amst) 8, 857 – 864 (2009)

T. Manna, D.A. Thrower, S. Honnappa, M.O. Steinmetz, L. Wilson
Regulation of microtubule dynamic instability in vitro by differentially phosphorylated stathmin
J. Biol. Chem. 284, 15640 – 15649 (2009)

Y. Nie, C. Bieniossek, D. Frey, N. Olieric, C. Schaffitzel, M.O. Steinmetz, I. Berger
ACEMBLing multigene expression vectors by recombineering
Nat. Protocols, doi: 10.1038/nprot.2009.104 (2009)

E. Pennacchietti, T. M. Lammens, G. Capitani, M.C. Franssen, R. A. John, F. Bossa, D. De Biase
Mutation of His465 alters the pH-dependent spectroscopic properties of Escherichia coli glutamate decarboxylase and broadens the range of its activity toward more alkaline pH
J Biol Chem. 284, 31587 – 31596 (2009)

B. Schulz, C.U. Stirnimann, J.P.A. Grimshaw, M.S. Brozzo, F. Fritsch, E. Mohorko, G. Capitani, R. Glockshuber, M.G. Grütter, M. Aebi
Oxidoreductase activity of oligosaccharyltransferase subunits Ost3p and Ost6p defines site-specific glycosylation efficiency
Proc. Natl. Acad. Sci. USA 106, 11061 – 11066 (2009)

A. Studer, X. Han, F.K. Winkler, L.X. Tiefenauer
Monitoring insertion of melittin and hemolysin in lipid bilayers suspended in nanopores
Colloids and Surfaces
Biointerfaces B 73, 325 – 331 (2009)

E. Stuttfeld, K. Ballmer-Hofer
Structure and function of VEGF receptors
IUBMB Life 61, 915 – 922 (2009)

Q. Tan, A.M. El-Badry, C. Contaldo, R. Steiner, S. Hillinger, M. Welti, M. Hilbe, D.R. Spahn, R. Jaussi, G. Higuera, C.A. van Blitterswijk, Q. Luo, W. Weder
The effect of perfluorocarbon-based artificial oxygen carriers on tissue-engineered trachea
Tissue Eng Part A, 15, 2471 – 2480 (2009)

M. Tremmel, A. Matzke, I. Albrecht, A.M. Laib, V. Olaku, K. Ballmer-Hofer, G. Christofori, M. Heroult, H.G. Augustin, H. Ponta, V. Orian-Rousseau
A CD44v6 peptide reveals a role of CD44 in VEGFR-2 signaling and angiogenesis
Blood 114, 5236 – 5244 (2009)

C. Wasmer, L. Benkemoun, R. Sabaté, M.O. Steinmetz, B. Coulary-Salin, L. Wang, R. Riek, S. Saupe, B.H. Meier
Solid-State NMR reveals that E. coli inclusion bodies of HET-s(218-289) are amyloids
Angew. Chem. Int. Ed. Engl. 48, 4858 – 4860 (2009)

Dissertations

C.O. De Groot
ETH Zürich (2009)
Structure function relationships of mammalian end binding proteins
F.K. Winkler (examiner), M.O. Steinmetz (co-examiner)

D. Dell'Era Dosch
ETH Zürich (2009)
Functional analysis of transmembrane domain mutants of vascular endothelial growth factor receptor 2 (VEGFR-2)
F.K. Winkler (examiner), K. Ballmer-Hofer, S. Werner (co-examiners)

A. Studer
ETH Zürich, Diss ETH No. 18473, (2009):
Investigation on planar lipid bilayers in nano-pores to study the function of membrane proteins
F.K. Winkler (examiner), K. Locher, J. Vörös, L. Tiefenauer (co-examiners)

A. Weisbrich
ETH Zürich (2009)
Structure-function relationship of microtubule plus-end tracking proteins (+TIPs)
F.K. Winkler (examiner), Y. Barral, M.O. Steinmetz (co-examiners)

Invited talks

K. Ballmer-Hofer
Angiogenic signaling by VEGF family growth factors; from ligand binding to receptor activation
Angiogenesis, Present and Future, Timisoara, Romania, March 26 – 28, 2009

K. Ballmer-Hofer
Recombinant production of proteins in pro- and eukaryotic expression systems: where bacteria fail, yeasts, insect and mammalian cells succeed
Università Degli Studi di Brescia, Facoltà di Medicina e Chirurgia, Italy, May 4 – 6, 2009

K. Ballmer-Hofer
Angiogenic signaling by VEGF family growth factors; a structure/function analysis of VEGF receptor activation
Università Degli Studi di Brescia, Facoltà di Biomediche e Biotecnologie, Italy, May 5, 2009

K. Ballmer-Hofer
Angiogenic signaling by VEGF family growth factors; from ligand binding to receptor activation
6th International Conference on Inhibitors of Protein Kinases, Warsaw, Poland, June 27 – July 1, 2009

G. Capitani
Structural studies of the type 1 pilus system from uropathogenic E. coli
P2P seminar series, Dept. of Biology, University of Padua – Italy, February 27, 2009

G. Capitani
Structural studies of type 1 pili from uropathogenic E. coli (Keynote lecture)
38th Congress of the Italian Crystallographic Association, Salerno, Italy, September 22, 2009

X.-D. Li
Membrane proteins and drug design
Speaker at Chinese Association of Science and Technology in Switzerland, ETHZ, Zürich, Switzerland, June 13, 2009

X.-D. Li
The role of AmtB-GlnK complex in nitrogen regulation
Speaker at Joint Conference of the Asian Crystallographic Association & Chinese Crystallography Society AsCA'09, Beijing, China, Oct 22 – 25, 2009

M.O. Steinmetz
Structure-function relationship of CAP-Gly domains
The EMBO Meeting 2009, Amsterdam, The Netherlands, August 29, 2009

M.O. Steinmetz
An EB1-binding motif acts as a microtubule tip localization signal
Alpbach Workshop 2009 on coiled coils, collagen and co-proteins, Alpbach, Austria, September 7, 2009

M.O. Steinmetz
An EB1-binding motif acts as a microtubule tip localization signal
FEBS Workshop on protein modules and networks in health and disease, Seefeld in Tirol, Austria, September 10, 2009

M.O. Steinmetz
Tracking the ends: a dynamic protein network controls the fate of microtubule tips
Workshop on biomolecular interactions by experimental methods, Brno, Czech Republic, November 4, 2009

Sabbatical Stay

X.-D. Li
Invited by the director Prof. Hongjie Xu from Shanghai Synchrotron Radiation Facility (SSRF), Shanghai Institute of Applied Physics, Chinese Academy of Sciences to guide students and staff scientists on different aspects of membrane proteins (July 6 – 24 2009)

Invited seminars

M.O. Steinmetz
Tracking the ends: a dynamic protein network controls the fate of microtubule tips
CNRS, Laboratoire d'Enzymologie et Biochimie Structurales, Gif-Sur-Yvette, France, January 15, 2009

M.O. Steinmetz
Tracking the ends: a dynamic protein network controls the fate of microtubule tips
Basilea Pharmaceutica Inc., Basel, Switzerland, January 20, 2009

M.O. Steinmetz
Tracking the ends: a dynamic protein network controls the fate of microtubule tips
University of Edinburgh, School of Biological Sciences, Edinburgh, UK, March 16, 2009

M.O. Steinmetz
Tracking the ends: a dynamic protein network controls the fate of microtubule tips
Institut Curie Centre de Recherche, Orsay, France, March 26, 2009

M.O. Steinmetz
Tracking the ends: a dynamic protein network controls the fate of microtubule tips
Max-Planck-Institute for Developmental Biology, Tübingen, Germany, May 6, 2009

M.O. Steinmetz
Tracking the ends: a dynamic protein network controls the fate of microtubule tips
Biozentrum University of Basel, Basel, Switzerland, May 12, 2009

M.O. Steinmetz
Mechanisms of dynamic +TIP interactions
Erasmus Medical Center, Rotterdam, The Netherlands, May 25, 2009

M.O. Steinmetz
Tracking the ends: a dynamic protein network controls the fate of microtubule tips
Harvard Medical School, Boston, USA, July 10, 2009

Posters

A. Studer, F. K. Winkler, L. Tiefenauer
Monitoring integration of proteins into free-standing lipid bilayers
USGEB Annual meeting 2009 on Membranes in Motion, January 29 – 30, 2009, Interlaken Switzerland

S. Demarche, A. Studer, D. Langenegger, J. Vörös, L. Tiefenauer
Nanopatterned lipid bilayers for investigating membrane proteins
ESF-EMBO symposium about “Biological surfaces and interfaces” Sant Feliu de Guixols (Costa Brava), Spain, June 27 – July 2, 2009

LIST OF PUBLICATIONS 2009

Radiochemistry and Environmental Chemistry

HEAVY ELEMENTS

R. C. Barber, H. W. Gäggeler, P. J. Karol, H. Nakahara, E. Vardaci, E. Vogt
Discovery of the element with atomic number112
Pure Appl. Chem., **81** (7) 1331 (2009).

L. Canella, P. Kudejova, R. Schulze, A. Türler, J. Jolie
PGAA, PGAI and NT with cold neutrons: Test measurement on a meteorite sample
Appl. Rad. Isotopes **67** (12): 2070-2074 (2009).

R. Dressler, R. Eichler, D. Schumann, S. Shishkin
Long-term alpha - and spontaneous fission measurement of a Rf/Db sample chemically prepared in a Ca-48 on Am-243 experiment
Phys. Rev. C 79(5), 054605 (2009).

J. Dvorak, W. Brüchle, C. E. Düllmann, Z. Dvorakova, K. Eberhardt, R. Eichler, E. Jäger, Y. Nagame, Z. Qin, M. Schädel, B. Schausten, E. Schimpf, R. Schuber, A. Semchenkov, P. Thörle, A. Türler, M. Wegrzecki, A. Yakushev
Cross section limits for the Cm-248(Mg-25,4n-5n) Hs-(268,269) reactions
Phys. Rev. C 79(3), 037602 (2009).

C. M. Folden Iii, I. Dragojević, C. E. Düllmann, R. Eichler, M. A. Garcia, J. M. Gates, S. L. Nelson, R. Sudowe, K. E. Gregorich, D. C. Hoffman, H. Nitsche
Measurement of the Pb-208 (Cr-52,n) Sg-259 excitation function
Phys. Rev. C 79(2), 027602 (2009).

X. Lin, H. Gerstenberg, Ch. Lierse von Gostomski, R. Henkelmann, A. Türler, M. Rossbach
Determination of k_0-values for the reactions $^{94}Zr\ (n,\gamma)\ ^{95}Zr$ and $^{96}Zr\ (n,\ \gamma)\ ^{97}Zr\ -^{97m}Nb$ by irradiation in highly thermalized neutron flux
Appl. Rad. Isotopes **67** (12): 2092-2096 (2009).

SURFACE CHEMISTRY

B. D'Anna, A. Jammoul, C. George, K. Stemmler, S. Fahrni, M. Ammann, A. Wisthaler
Light-induced ozone depletion by humic acid films and submicron aerosol particles
J. Geophys. Res. **114** (2009).

A. Rouviere, P. F. DeCarlo, A. Schlierf, O. Favez, B. D'Anna, C. George, A. Prevot, M. Ammann
Photosensitized aging of succinic acid aerosol
Geochim. Cosmochim. Acta **73**(13), A1125 (2009).

Y. Sosedova, A. Rouvière, H.W. Gäggeler, M. Ammann
Uptake of NO_2 to deliquesced dihydroxybenzoate aerosol particles
J. Phys. Chem. A **113**(41), 10979-10987 (2009).

M.G.C. Vernooij, M. Mohr, G. Tzvetkov, V. Zelenay, T. Huthwelker, R. Kaegi, R. Gehrig, B. Grobéty
On source identification and alteration of single diesel and wood smoke soot particles in the atmosphere; an X-Ray microspectroscopy study
Environ. Sci. Technol. **43**(14), 5339-5344 (2009).

O. Vesna, M. Sax, M. Kalberer, A. Gaschen, M. Ammann
Product study of oleic acid ozonolysis as function of humidity
Atmos. Environ. **43**(24), 3662-3669 (2009).

A. Vlasenko, T. Huthwelker, H. W. Gäggeler, M. Ammann
Kinetics of the heterogeneous reaction of nitric acid with mineral dust particles: An aerosol flowtube study
Phys. Chem. Chem. Phys. **11**(36), 7921-7930 (2009).

ANALYTICAL CHEMISTRY

A. Eichler, S. Brütsch, S. Olivier, T. Papina, M. Schwikowski
A 750 year ice core record of past biogenic emissions from Siberian boreal forests
Geophys. Res. Lett. **36** (2009).

A. Eichler, S. Olivier, K. Henderson, A. Laube, J. Beer, T. Papina, H. W. Gäggeler, M. Schwikowski
Temperature response in the Altai region lags solar forcing
Geophys. Res. Lett. **36** (2009).

A. Eichler, S. Olivier, K. Hendersen, A. Laube, J. Beer, T. Papina, H.W. Gäggeler, M. Schwikowski
Temperature changes in the Altai are driven by solar and anthropogenic forcing
Chimia **63**, 1 (2009).

U. Heikkila, J. Beer, J. Feichter, V. Alfimov, H. A. Synal, U. Schotterer, A. Eichler, M. Schwikowski, L. Thompson
Cl-36 bomb peak: Comparison of modeled and measured data
Atmos. Chem. Phys. **9**(12), 4145-4156 (2009).

T. M. Jenk, S. Szidat, D. Bolius, M. Sigl, H. W. Gäggeler, L. Wacker, M. Ruff, C. Barbante, C. F. Boutron. M. Schwikowski
A novel radiocarbon dating technique applied to an ice core from the Alps indicating late Pleistocene ages
J. Geophys. Res. **114** (2009).

S. Panebianco, K. Berg, J.C. David, M. Eid, U. Filges, F. Gröschel, A. Guertin, A.Y. Konobeyev, C. Latge, S. Lemaire, S. Leray, A. Letourneau, M. Luthy, F. Michel-Sendis, S. Scazzi, G. Stankunas, N. Thiolliere, L. Tobler, L. Zanini
Neutronic characterization of the MEGAPIE target
Ann. Nucl. Energy **36**, 350 (2009).

M. Schwikowski, A. Eichler, I. Kalugin, D. Ovtchinnikov, T. Papina
Past climate variability in the Altai
PAGES News Vol. **17** N°1, 44-45 (2009).

M. Sigl, T. M. Jenk, T. Kellerhals, S. Szidat, H. W. Gäggeler, L. Wacker, H.-A. Synal, C. Boutron, C. Barbante, J. Gabrieli, M. Schwikowski
Towards radiocarbon dating of ice cores
J. Glaciol. **55** (194), 986-996 (2009).

F. Thevenon, F. S. Anselmetti, S. M. Bernasconi, M. Schwikowski
Mineral dust and elemental black carbon records from an alpine ice core (Colle Gnifetti glacier) over the last millennium
J. Geophys. Res. **114** (2009).

F. Vimeux, P. Ginot, M. Schwikowski, M. Vuille, G. Hoffmann, L. G. Thompson, U. Schotterer
Climate variability during the last 1000 years inferred from Andean ice cores: A review of methodology and recent results
Palaeogeogr., Palaeoclim., Palaeoeco. **281**(3-4), 229-241 (2009).

RADWASTE ANALYTICS

M. Ayranov, U. Krähenbühl, S. Röllin, M. Burger
Sensitivity of DF-ICP-MS, PERALS and alpha spectrometry for the determination of actinides: A comparison
J. Radioanal. Nucl. Chem. **279**(2), 475 - 480 (2009).

M. Ayranov, J. Cobos, K. Popa, V.V. Rondinella
Determination of REE, U, Th, Ba, and Zr in simulated hydrogeological leachates by ICP-AES after matrix solvent extraction
Journal of Rare Earths **27**(1), 123 (2009).

C. Domingo-Pardo, I. Dillmann, T. Faestermann, U. Giesen, J. Gorres, M. Heil, S. Horn, F. Kappeler, S. Köchli, G. Korschinek, J. Lachner, M. Maiti, J. Marganiec, J. Neuhausen, R. Nolte, M. Poutivtsev, R. Reifarth, R. Rugel, D. Schumann, E. Uberseder, F. Voss, S. Walter, M. Wiescher
S-process nucleosynthesis in massive stars: New results on Fe-60, Ni-62 and Ni-64
Capture Gama-Ray Spectroscopy and Related Topics **1090** 230-237 (2009).

G. Rugel, T. Faestermann, K. Knie, G. Korschinek, M. Poutivtsev, D. Schumann, N. Kivel, I. Günther-Leopold, R. Weinreich, M. Wohlmuther
New measurement of the Fe-60 half-life
Phys. Rev. Lett. **103**(7), 072502-4 (2009).

D. Schumann, J. Neuhausen, J. Eikenberg, M. Rüthi, M. Wohlmuther, P. W. Kubik, H.-A. Synal, V. Alfimov, G. Korschinek, G. Rugel, T. Faestermann
Radiochemical analysis of a copper beam dump irradiated with high-energetic protons
Radiochim. Acta **97**(3), 123-131 (2009).

E. Uberseder, R. Reifarth, D. Schumann, I. Dillmann, C. D. Pardo, J. Gorres, M. Heil, F. Kappeler, J. Marganiec, J. Neuhausen, M. Pignatari, F. Voss, S. Walter, M. Wiescher
Measurement of the Fe-60(n,gamma)Fe-61 cross section at stellar temperatures
Phys. Rev. Lett. **102**(15), (2009).

ENVIRONMENTAL RADIONUCLIDES UNIVERSITÄT BERN

R. Fisseha, M. Saurer, M. Jaggi, R.T.W. Siegwolf, J. Dommen, S. Szidat, V. Samburova, U. Baltensperger
Determination of primary and secondary sources of organic acids and carbonaceous aerosols using stable carbon isotopes
Atmos. Environ. **43**(2), 431-437 (2009).

K. Hippe, F. Kober, H. Baur, M. Ruff, L. Wacker, R. Wieler
The current performance of the in situ ^{14}C extraction line at ETH
Quaternary Geochronology **4**, 493-500, doi:10.1016/j.quageo.2009.06.001 (2009).

K. Li, E. Vogel, U. Krähenbühl
Measurement of I-129 in environmental samples by ICP-CRI-QMS: possibilities and limitations
Radiochim. Acta **97**, 453-458, doi:10.1524/ract.2009.1639 (2009).

S. Szidat
Atmosphere sources of Asian haze
Science **323**(5913), 470-471 (2009).

S. Szidat, M. Ruff, N. Perron, L. Wacker, H.A. Synal, M. Hallquist, A.S. Shannigrahi, K.E. Yttri, C. Dye, D. Simpson
Fossil and non-fossil sources of organic carbon (OC) and elemental carbon (EC) in Goteborg, Sweden
Atmos. Chem. Phys. **9**(5), 1521-1535 (2009).

S. Szidat
Radiocarbon analysis of carbonaceous aerosols: Recent developments
Chimia **63**(3), 157-161 (2009).

TECHNICAL REPORT

J. Neuhausen, D. Schumann, Ch. Zumbach, M. Dubs
Arbeitsschritte zur Zerlegung der Megapie-Schnitte H07, H08 und H09 (Expansionstank) und zur Probennahme für radiochemische Untersuchungen
TM 24-09-01, 2009.

REPORTS

Y. Dai, J. Neuhausen, D. Schumann, C. Zumbach
Specimen extraction plan for MEGAPIE PIE
MEGAPIE-Report MPR-11-DY34-001-2, 2009.

J. Neuhausen, D. Schumann, R. Dressler, S. Horn, S. Lüthi, St. Heinitz, S. Chiriki, T. Stora, M. Eller
Innovative waste management in the mercury loop of the EURISOL Multi-MW converter target
EURISOL-DS project, Task2 Deliverable D2, 2009.
http://www.eurisol.org/site02/doc_details.php?operation=download&docu=951&type=25

PATENT

J.M. Moreno, A. Türler, R. Henkelmann, E. Kabai, E. Huenges
Method for purification of ^{225}Ac from irradiated ^{226}Ra targets
US Patent No: US 2009/0191122 A1, 30.7.2009.

CONTRIBUTIONS TO CONFERENCES, WORKSHOPS AND SEMINARS

HEAVY ELEMENTS

L. Canella, P. Kudejova, R. Schulze, A. Türler, J. Jolie
The PGAA facility at FRM II
FRM-II Seminar, Garching, Germany, 18 May 2009.

R. Dressler
Estimation of statistical uncertainties in the case of rare events
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 6 March 2009.

R. Dressler, P. Rasmussen, R.Eichler, N.Schlumpf
pureCOLD for beta-alpha pile-up suppression: a status report
7-th Workshop on the Chemistry of the Heaviest Elements, Mainz, Germany, 11-13 October 2009.

R. Dressler for a PSI-University Bern-FLNR-LLNL-ITE-FZD collaboration
The challenge of using a physical preseparator in chemical experiments with super heavy elements: the stopping force problem
The fourth Asia-Pacific Symposium on Radiochemistry APSORC09, Napa, USA, 29 November - 4 December 2009.

R. Eichler
Chemical investigation of transactinide elements
Seminar on New Horizons in Actinide Chemistry Research , BARC, Mumbai, India, 6 January 2009.

R. Eichler
Gas phase chemistry with transactinide elements
NUCAR 2009 symposium, Mumbai, India, 7-10 January 2009.

R. Eichler for a PSI-University of Bern-FLNR-LLNL-ITE collaboration
Chemical investigation of element 114
237th ACS National Meeting, Salt Lake City, UT, USA, 22-26 March 2009.

R. Eichler for a PSI-University of Bern-FLNR-LLNL-ITE collaboration
Chemical investigation of superheavy elements 112 and 114
ACTINIDES´09, San Francisco, CA, USA, 12-17 July 2009.

R. Eichler
Gas phase chemistry with transactinides (The last 10 years and what's next)
GDCH Wissenschaftsforum Chemie, Frankfurt am Main, Germany, 30 August - 2 September 2009.

R. Eichler for a PSI-University of Bern-FLNR-LLNL-ITE collaboration
Chemical investigation of element 114
7-th Workshop on the Chemistry of the Heaviest Elements, Mainz, Germany, 11-13 October 2009.

H.W. Gäggeler
Actinides Research at the Laboratory of Radiochemistry and Environmental Chemistry
Radiochemistry Seminar on New Horizons in Actinide Chemistry Research, BARC, Mumbai, India, 6 January 2009.

H.W. Gäggeler
Radiochemical research in Switzerland
NUCAR 2009 symposium, Mumbai, India, 7-10 January 2009.

H.W. Gäggeler
From Mendeleev's principle to Einstein's relativity: news from the chemistry of superheavy elements
Int. Symp. Periodic Table of D.I. Mendeleev. The new superheavy elements, Dubna, Russia, 20-21 January 2009.

H.W. Gäggeler
Misserfolge und erfolglose Suchexperimente,
25 Jahre Labor für Radio- und Umweltchemie, Paul Scherrer Institut, Switzerland, 28 August 2009.

H.W. Gäggeler
Chemical studies of the currently heaviest members of the Periodic Table
Symposium of the occasion of 175 anniversary of D.I. Mendeleev, Tobolsk, Russia, 16-19 September 2009.

H.W. Gäggeler
Chemistry experiments with elements 112 and 114
EXON Conf., Sochi, Russia, 28 September - 2 October2009.

H.W. Gäggeler
From Mendeleev's principle to Einsteins relativity: news from the chemistry of superheavy elements
Institute of Advanced Study, Massey University, Albany (Auckland), New Zealand, 6 November 2009.

S. M. Lehenberger, K. P. Zhernosekov, A. Türler, S. Cohrs, K. Zimmermann, J. Grünberg, R. Schibli
Production and application of the low energy electron emitter ^{161}Tb *for endoradiotherapy as a better alternative to* ^{177}Lu
EANM 09, Annual Congress of the European Association of Nuclear Medicine, Barcelona Spain, 10-14 October 2009.

A. Serov
Model experiments with homologues of superheavy elements (SHE)
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 2 October 2009.

A. Serov, R. Eichler, H.W. Gäggeler
Adsorption interaction of In-113m and Tl-200-202 isotopes with quartz.
7-th Workshop on the Chemistry of the Heaviest Elements, Mainz, Germany, 11-13 October 2009.

D. Wittwer
Gas phase chemical studies of superheavy elements using the Dubna gas-filled recoil separator - stopping range determination
DCB Unibe 1st year graduate students symposium, Switzerland, 7 July 2009.

D. Wittwer
Stopping force estimations for element 114 in Mylar and argon gas
7-th Workshop on the Chemistry of the Heaviest Elements, Mainz, Germany, 11-13 October 2009

D. Wittwer
Gas phase chemical studies of superheavy elements using the Dubna gas-filled recoil separator - stopping range determination
TOURS 2009 - Tours Symposium on Nuclear Physics and Astrophysics VII, Kobe, Japan, 16-20 November 2009.

A. Türler
Nuclear structure and reaction studies near and at $Z = 108$ *and* $N = 162$
Symposium of the occasion of 175 anniversary of D.I. Mendeleev, Tobolsk, Russia, 16-19 September 2009.

A. Türler
Grundlagen der Nuklearchemie in 60 Minuten
GDCh Kolloquium Institut für Chemie, Martin-Luther-Universität Halle-Wittenberg, Halle, Germany, 13 May 2009.

A. Türler
Ausgewählte Themen nuklearchemischer Grundlagenforschung - ein Streifzug durch die Nuklidkarte
GDCh Kolloquium Institut für Chemie, Martin-Luther-Universität Halle-Wittenberg, Halle, Germany, 13 May 2009.

SURFACE CHEMISTRY

M. Ammann, T. Huthwelker, M. Kerbrat, T. Bartels-Rausch, A. Křepelová
Flow tube, diffusion tube and molecular level spectroscopic studies of nitrous, nitric and pernitric acid uptake on ice
SCOUT-O3 Laboratory Activity 5 Annual Meeting, Mainz, Germany, 16-18 February 2009.

M. Ammann, V. Zelenay, A. Křepelová, J. Raabe, B. Watts, T. Huthwelker
The climate effect of atmospheric particles caught in act
JUM@P'09: Joint Users' meeting at PSI, Villigen, 12-13 October 2009.

M. Ammann, A. Rouvière, Y. Sosedova, C. George, B. D'Anna, V. Zelenay, A. Křepelová, T. Huthwelker
Microchemistry and microstructure of organic particles
EUCAARI Annual Meeting, Stockholm, Sweden, 16-20 November 2009.

M. Ammann, A. Rouvière
Effect of fatty acid coatings on ozone uptake to deliquesced KI/NaCl aerosol particles
AGU Fall Meeting, San Francisco, California, USA, 14-18 December 2009.

T. Bartels-Rausch, M. Kerbrat, A. Křepelová, M. Ammann
Snow as reactor
10th Swiss Global Change Day, Bern, Switzerland, 31 March 2009.

T. Bartels-Rausch, J. Kleffmann, Y. Elshorbany, M. Brigante, C. George, B. D'Anna, A. Bernhard, M. Schläppi, M. Schwikowski, M. Ammann
HONO and Hg: Photo-enhanced reductions in ice by organics
European Geosciences Union General Assembly Vienna, Austria, 20-24 April 2009.

T. Bartels-Rausch, M. Kerbrat, T. Huthwelker, A. Křepelová, T. Ulrich, M. Ammann
Beyond adsorption: Recent approaches in the laboratory to study uptake of trace gases to ice
Fifth SCOUT-O3 Annual Meeting, Schliersee, Germany, 15-17 June 2009.

T. Bartels-Rausch
Recent approaches in the laboratory to study uptake and reactivity of trace gases on ice
Laboratoire de Physique et de Chimie de l'Environnement et de l'Espace, CNRS and University of Orleans, France, 3-5 September 2009.

T. Huthwelker, A. Křepelová, V. Zelenay, T. Bartels-Rausch, M. Janousch, M. Ammann
X-ray spectroscopy of frozen salt solutions: Are inclusions solid or liquid below eutectic temperature?
European Geosciences Union General Assembly Vienna, Austria, 20-24 April 2009.

T. Huthwelker, A. Křepelová, M. Janousch, T. Bartels-Rausch, M. Ammann
X-ray spectroscopy of frozen salt solutions: The liquid nature of ions in frozen solutions
XAFS XIV, Camerino, Italy, 26-31 July 2009.

T. Huthwelker, A. Křepelová, T. Bartels-Rausch, V. Zelenay, M. Janousch and M. Ammann
The aqueous nature of ions in frozen salt solutions at temperatures below the eutectic temperature
JUM@P'09: Joint Users' meeting at PSI, Villigen, 12-13 October 2009.

M. Kerbrat, T. Huthwelker, A. Křepelová, T. Ulrich, T. Bartels-Rausch, M. Ammann
Flow tube and molecular level spectroscopy studies of nitrous, nitric and pernitric acid uptake on ice
Fifth SCOUT-O3 Annual Meeting, Schliersee, Germany, 15-17 June 2009.

A. Křepelová, T. Huthwelker, M. Janousch, M. Ammann
X-ray studies of halogen salt impurities in ice
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, University of Berne and Paul Scherrer Institut 3 April 2009.

A. Křepelová, M. Ammann, J.T. Newberg, H. Bluhm, T. Huthwelker
The effect of strong acids on the ice - air interface studied by X-ray photoelectron spectroscopy
European Geosciences Union General Assembly Vienna, Austria, 20-24 April 2009.

A. Křepelová, M. Ammann, T. Huthwelker, J.T. Newberg, H. Bluhm
X-ray photoelectron spectroscopy of halogen salt impurities in ice
JUM@P'09: Joint Users' meeting at PSI, Villigen, Switzerland, 12-13 October 2009.

A. Křepelová, M. Ammann, J.T. Newberg, H. Bluhm, T. Huthwelker
Impact of strong acids on ice surface melting studied by XPS and NEXAFS
Advanced Light Source Users' Meeting Lawrence Berkeley National Laboratory, Berkeley, USA, 15-17 October 2009.

A. Rouvière, Y. Sosedova, M. Ammann, H. W. Gäggeler
Determination of bulk accommodation coefficient of NO_2 and O_3 to inorganic/organic aerosols
European Aerosol Conference, Karlsruhe, Germany, 6-11 September 2009.

A. Rouvière, P. F. DeCarlo, A. Schlierf, O. Favez, B. D'Anna, C. George, A. Prévôt, M. Ammann
Photosensitized transformation of dicarboxylic acid in aerosols
European Aerosol Conference, Karlsruhe, Germany, 6-11 September 2009.

A. Rouvière, P. F. DeCarlo, B. D'Anna, C. George, A. Prévôt, M. Ammann
Influence of a photosensitizer on the aging of succinic acid aerosol
INTROP Conference on "Tropospheric Chemistry", Portoroz, Slovenia, 14-17 April 2009.

A. Rouvière, M. Ammann
Effect of organic coating on ozone uptake to deliquesced potassium iodide particles
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 8 Mai 2009.

A. Rouvière, M. Ammann
Reactive uptake of O_3 on deliquesced KI particles coated with fatty acids and SDS
13th IACIS International Conference on Surface and Colloid Science New-York, U.S.A, 14-19 June 2009

A. Rouvière, P. F. DeCarlo, A. Schlierf, O. Favez, B. D'Anna, C. George, A. Prévôt, M. Ammann
Photosensitized aging of succinic acid aerosol
Goldschmidt 2009 - "Challenges to Our Volatile Planet", Davos, Switzerland, 21-26 June 2009.

A. Rouvière, P. DeCarlo, T. Bartels-Rausch, M. Ammann
Effect of photosensitized chemistry on organic aerosol evolution
AGU Fall Meeting, San Francisco, California, USA, 14-18 December 2009.

Y. Sosedova, A. Rouvière, M. Birrer, M. Ammann
Bulk reaction limited uptake of NO_2 by aerosols containing hydroquinone and gentisic acid
INTROP Conference on "Tropospheric Chemistry", Portoroz, Slovenia, 14-17 April 2009.

Y. Sosedova
NO_2 uptake on aqueous phenolic aerosols:Dark and illuminated conditions
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 2 October 2009.

V. Zelenay, T. Huthwelker, A. Křepelová, M. Birrer, M. Ammann
Observation of water uptake in aerosol particles using microspectroscopy
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Bern, Switzerland, 3 April 2009.

V. Zelenay, T. Huthwelker, A. Křepelová, M. Birrer, M. Ammann
Observations of water uptake in ammonium sulfate particles using x-ray microspectroscopy
INTROP Conference on "Tropospheric Chemistry", Portoroz, Slovenia, 14-17 April 2009.

V. Zelenay, A. Křepelová, M. Birrer, T. Tritscher, R. Chirico, T. Huthwelker, M. Ammann
Soot- water uptake
NEADS Workshop, PSI, Villigen, Switzerland, 7 July 2009.

V. Zelenay, A. Křepelová, M. Birrer, T. Huthwelker, M. Ammann
Fulvic acids: Tracking morphological changes upon water uptake
JUM@P'09: Joint Users' meeting at, PSI, Villigen, 12-13 October 2009.

V. Zelenay, A. Křepelová, M. Birrer, T. Tritscher, R. Chirico, T. Huthwelker, M. Ammann
Water uptake in single soot particles- an X-ray microspectroscopy study
ETH Seminar, ETHZ, Zürich, Switzerland, 2 December 2009.

ANALYTICAL CHEMISTRY

A. Eichler
Gletscher als Klima- und Umweltarchive
Metrohm Schweiz IC User Meeting, Zofingen, Switzerland, 22 October 2009.

J. Gabrieli, G. Cozzi, P. Vallelonga, M. Schwikowski, M. Sigl, C. Boutron, C. Barbante
A fast semi-quantitative method for plutonium determination in an alpine firn/ice core
European Geosciences Union General Assembly Vienna, Austria, 20-24 April 2009.

J. Gabrieli, P. Vallelonga, W. Cairn, G. Cozzi, F. Decet, M. Schwikowski, M. Sigl, C. Boutron, C. Barbante
A novel firn/ice-core melter system for semi-continuous extraction of PAHs and continuous ICP-QMS trace element analysis
EGU General Assembly, Vienna, Austria, 19–24 April 2009.

H.W. Gäggeler
On the way to quantify human impact on climate: pollution records and climatic information from alpine ice cores
University of Waikato, Hamilton, New Zealand, 13 November 2009.

H.W. Gäggeler
On the way to quantify human impact on climate: pollution records and climatic information from alpine ice cores
Massey University, Albany (Auckland), New Zealand, 18 December 2009.

S. Kaspari, M. Schwikowski, M. Gysel, P.A. Mayewski, S. Kang, S. Hou
Recent increase in black carbon concentrations from a Mt. Everest ice core spanning 1860-2000 AD
AGU Fall Meeting, San Francisco, California, USA, 14–18 December 2009.

M. Schläppi, T. Jenk, A. Rivera, G. Casassa, M. Schwikowski
Analytical tools for the investigation of climate parameters stored in an ice core from the Southern Patagonia Ice Field
Analytical Chemistry Symposium, ETH Zürich, Switzerland, 13 May 2009.

M. Schläppi
Carbonaceous particles in Pio XI glacier
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 6 November 2009.

M. Schwikowski
Schnee von gestern - Gletschereis als Klimaarchiv
Veranstaltung für die Aktionäre, Obligationäre, Geschäftspartner und Freunde der Edisun Power Gruppe, Zürich, Switzerland, 20 January 2009.

M. Schwikowski
High-alpine glaciers as archives of atmospheric pollution and climate
Workshop on Muon Tomography and Emulsions, University of Bern, Switzerland, 29 January 2009.

M. Schwikowski
Klimageschichte aus alpinen Eisbohrkernen
SAC Lindenberg, Wohlen, Switzerland, 13 March 2009.

M. Schwikowski
High-mountain glaciers as climate archives
Conference High Mountain Glaciers and Climate Change, Tromsø, Norway, 7-10 June 2009.

M. Schwikowski
Gletscher - lesen in den Klimaarchiven der Erde
Lions Club Brugg, Untersiggenthal, Switzerland, 11 August 2009.

M. Schwikowski
Von kalten Füssen und warmen Gletschern
25 Jahre Labor für Radio- und Umweltchemie, Paul Scherrer Institut, Switzerland, 28 August 2009.

M. Sigl, H.W. Gäggeler, A. Kress, M. Schwikowski
The variability of $\delta^{18}O$ in an Alpine ice core reflects long-term trends of past summer (May-July) temperatures
Millennium European Climate 3rd Milestone Meeting, Cala Millor Mallorca, Spain, 2-6 March 2009.

M. Sigl, H.W. Gäggeler, M. Schwikowski
The variability of $\delta^{18}O$ in an Alpine ice core reflects long-term trends of past summer (May-July) temperatures
10th Swiss Global Change Day, Bern, Switzerland, 31 March 2009.

M. Sigl
1.000 year history of Saharan dust recorded in an Alpine ice core
Seminar – WSL Dendro Sciences, Birmensdorf, Switzerland, 16 September 2009.

RADWASTE ANALYTICS

M. Ayranov
Currents status of the remotely controlled system for the radiochemical separation of exotic isotopes from accelerator wastes
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 6 March 2009.

M. Ayranov, D. Schumann
Production of ^{7}Be, ^{44}Ti and ^{60}Fe from proton irradiated copper beam dump and SINQ cooling water
Nuclear Physics in Astrophysics IV, Frascati, Italy, 8-12 June 2009.

M. Ayranov, Z. Tosheva, A. Kies
Determination of ^{210}Pb and ^{210}Po in water samples
International Topical Conference on Po and Radioactive Pb Isotopes, Seville, Spain, 26-28 October 2009.

M. Ayranov, D. Schumann
^{60}Fe samples for nuclear astrophysics experiments
TOURS 2009, Kobe, Japan, 16-20 November 2009.

S. Heinitz
Environmental compliance report concerning the chemical reactivity of Lead Bismuth – Estimations for ESS
ESS-PP Meeting Lund, Sweden, 1 October 2009.

S. Heinitz
Extraction and migration of polonium out of Lead-Bismuth Eutectic
ITC-9, Tokai, Japan, 3 December 2009.

J. Neuhausen, L. Zanini, St. Heinitz, D. Schumann, V. Boutellier, M. Ruethi, J. Eikenberg
Nuclear reaction product distribution in a p-irradiated liquid LBE target and
Po-extraction from LBE
EUROTRANS DM4 Technical Review Meeting, Karlsruhe Institute of Technology, Karlsruhe, Germany, 3 March 2009.

J. Neuhausen
Recent results on the chemistry of liquid lead-bismuth and mercury targets
Information Exchange Meeting on activated LBE-Handling techniques, SCK-CEN, Mol, Belgium, 25 May 2009.

J. Neuhausen, D. Schumann, Ch. Zumbach, M. Dubs
Radiochemische Untersuchungen am Megapie-Target
MEGAPIE PIE-Meeting, Paul Scherrer Institute, Villigen, Switzerland, 20 August 2009.

J. Neuhausen, St. Heinitz, F. v. Rohr, D. Schumann, S. Lüthi, S. Horn, R. Dressler, B. Eichler, M. M. Marin Marmol, St. Keller, S. Müller, L. Zanini, V. Boutellier, M. Ruethi, J. Eikenberg
Mechanisms of spallation product release and deposition: Summary of achieved results
EUROTRANS DM4 Technical Meeting, Bologna, Italy, 16 September 2009.

J. Neuhausen
HLM-Handbook chapter 5
8-th Meeting of the OECD-NEA Expert Group for Heavy Liquid Metal Technology, Bologna, Italy, 17 September 2009.

J. Neuhausen, D. Schumann, Ch. Zumbach, M. Dubs
Radiochemical investigations of the Megapie-target
MEGAPIE Project Coordination Group and Steering Committee Meeting, Paul Scherrer Institute, Villigen, Switzerland, 5 November 2009.

J. Neuhausen, D. Schumann, R. Dressler, S. Horn, S. Lüthi, St. Heinitz, S. Chiriki
Radiochemistry of the EURISOL mercury target
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 11 December 2009

D. Schumann
Radiochemical analysis of proton-irradiated lead targets
NUDATRA-meeting, Madrid, Spain, 3-5 March 2009.

D. Schumann
Exotic radionuclides from accelerator waste for science and technology
Seminar at University of Vienna, Austria, 19. March 2009.

D. Schumann
Bestimmung des Radionuklidinventars von Proben aus der Spallationsneutronenquelle (SINQ) des Paul Scherrer Instituts
Jahrestagung Kerntechnik, Dresden, Germany, 8-14 May 2009.

D. Schumann
Preparation of ^{60}Fe samples for nuclear physics experiments
NPA4 Gran Sasso, Italy, 8-12 June 2009.

D. Schumann
Working plan task 8.2.
ESS-PP meeting Jülich, Germany, 18 June 2009.

D. Schumann
Intermediate report
ESS-PP meeting Lund, Sweden, 30 September - 1 October 2009.

D. Schumann
Determination of the radionuclide inventory of samples from a spallation neutron source
ICEM Liverpool, Great Britain, 12-15 October 2009.

D. Schumann
Accurate nuclear data for nuclear energy sustainability
MEGAPIE PCG meeting, Villigen, Switzerland, 5 November 2009.

D. Schumann
Separation of ^{60}Fe samples from an irradiated beam dump for nuclear astrophysics experiments
APSORC09, Napa, USA, 29 November - 4 December 2009.

ENVIRONMENTAL RADIONUCLIDES UNIVERSITÄT BERN

D. Ceburnis D, C.D. O'Dowd, A. Garbaras, V. Remeikis, M. Rinaldi, S. Szidat, S. Fahrni, A.S.H. Prévôt, N. Perron, L. Wacker, S. Leinert
Proof of biogenic origin of marine aerosol by ^{13}C and ^{14}C analysis
19th Goldschmidt Conference, Davos, Switzerland, 21-26 June 2009.
S. Fahrni
Compound-specific radiocarbon analysis
Seminar Ion Beam Physics, ETH Zürich, Switzerland, 29 April 2009.

S. Fahrni
Compound-specific radiocarbon analysis – part II
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 8 May 2009.

S. Fahrni, H.W. Gäggeler, M. Ruff, L. Wacker, S. Szidat
A preparative 2D-chromatography method for compound-specific radiocarbon analysis of aerosol components
20th International Radiocarbon Conference, Kona/Hawaii, USA, 31 May - 5 June 2009.

H.W. Gäggeler
Micro-radiocarbon determination with the table-top AMS system MICADAS
Methods and Applications of Radioanalytical Chemistry – MARC VIII, Kailua-Kona, Hawaii, USA, 5–10 April 2009.

H.W. Gäggeler, S. Szidat,
Microanalytical ^{14}C measurements on carbonaceous aerosol particles
APSORC'09 Conference, Napa, CA, USA, 29 November - 4 December 2009.

M. Němec
Optimisation of graphitisation procedure at AGE-1
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 3 April 2009.

M. Němec, L. Wacker
AGE: Optimization of the graphitization procedure
DPG Frühjahrstagung, Hamburg, Germany, 2-6 March 2009.

M. Němec, L. Wacker
Optimization of the automated graphitization system AGE-1
20th International Radiocarbon Conference, Kona/Hawaii, USA, 31 May - 5 June 2009.

M. Němec, L. Wacker, I. Hajdas
Alternative methods for cellulose preparation for AMS measurement
20th International Radiocarbon Conference, Kona/Hawaii, USA, 31 May - 5 June 2009.

N. Perron, S. Szidat, A. S. H. Prévôt, U. Baltensperger
EC: not easy
Seminar Laboratory of Atmospheric Chemistry, Paul Scherrer Institut, Switzerland, 6 April 2009.

N. Perron, S. Szidat, S. Fahrni, L. Wacker, A.S.H. Prévôt, U. Baltensperger
Radiocarbon on-line analysis of atmospheric samples
20th International Radiocarbon Conference, Kona/Hawaii, USA, 31 May - 5 June 2009.

N. Perron, S. Szidat, A. S. H. Prévôt, U. Baltensperger
Particulate matter characterisation in the Swiss Rhone Valley
Seminar of the Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institut and University of Bern, 6 November 2009.

N. Perron, S. Szidat, A. S. H. Prévôt, U. Baltensperger
Carbonaceous aerosol characterisation in the Swiss Rhone Valley
Seminar Laboratory of Atmospheric Chemistry, Paul Scherrer Institut, Switzerland, 16 November 2009

A.S.H. Prévôt, S. Szidat, N. Perron, V. Lanz, M.R. Alfarra, P. DeCarlo, C. Mohr, U. Baltensperger
Fossil and non-fossil primary and decondary organica aerosol
19th Goldschmidt Conference, Davos, Switzerland, 21-26 June 2009.

A.S.H. Prévôt, S. Szidat, N. Perron, V. Lanz, M.R. Alfarra, P. DeCarlo, C. Mohr, U. Baltensperger
Assessment of fossil and non-fossil primary and secondary organic aerosol
European Aerosol Conference, Karlsruhe, Germany, 6-11 September 2009.

S. Szidat, S. Schmoker, B. Gasser, H.W. Gäggeler, I. Hajdas, L. Wacker, H. Veit
Isolation of different soil components for radiocarbon dating of an alluvial fan
20th International Radiocarbon Conference, Kona/Hawaii, USA, 31 May - 5 June 2009.

S. Szidat, S. Fahrni, N. Perron, A.S.H. Prévôt, M. Ruff, L. Wacker, U. Baltensperger
Fossil and non-fossil sources of carbonaceous aerosols from ^{14}C
19th Goldschmidt Conference, Davos, Switzerland, 21-26 June 2009.

S. Szidat
Bestimmung von Aerosolquellen mit ^{14}C: Erster Schritt zur Verbesserung der Luftqualität
GDCh-Wissenschaftsforum Chemie 2009, Frankfurt/Main, Germany, 30 August - 2 September 2009.

S. Szidat, N. Perron, S. Fahrni, M. Ruff, L. Wacker, A.S.H. Prévôt, U. Baltensperger
Optimized separation of OC and EC for radiocarbon source apportionment
European Aerosol Conference, Karlsruhe, Germany, 6-11 September 2009.

M. Viana, T.A.J. Kuhlbusch, X. Querol, A. Alastuey, R.M. Harrison, P.K. Hopke, W. Winiwarter, M. Vallius, S. Szidat, A.S.H. Prévôt, C. Hueglin, H. Bloemen, P. Wåhlin, R. Vecchi, A.I. Miranda, A. Kasper-Giebl, W. Maenhaut, R. Hitzenberger
Source apportionment analysis of transport-related PM sources in Europe
17th Transport and Air Pollution Symposium, 3rd Environment and Transport Symposium, Toulouse, France, 2-4 June 2009.

L. Wacker, M. Ruff, S. Fahrni, M. Němec, S. Szidat, H.-A. Synal
How to measure small samples with a gas ion source
20th International Radiocarbon Conference, Kona/Hawaii, USA, 31 May - 5 June 2009.

L. Wacker, G. Bonani, I. Hajdas, B. Kromer, M. Němec, M. Ruff, H.-A. Synal
MICADAS: Routine and high-precision radiocarbon dating
20th International Radiocarbon Conference, Kona/Hawaii, USA, 31 May - 5 June 2009.

PUBLIC RELATIONS

Analytical Chemistry

- Media release
  EAWAG
  Neue Ergebnisse der Klimaforschung mit Eisbohrkernen
  8 January 2009.

- SF Schweizer Fernsehen, Schweizaktuell
  Fliegende Eisklötze
  19 January 2009.

- Spiegel Online
  Wie sich Klimawandel-Skeptiker die Erderwärmung kaltrechnen
  23 January 2009.

- Ecologist
  New studies disprove cosmic ray and solar influence theories of global warming
  6 February 2009.

- Die Zeit
  Der Heilige Krieg um die Erderwärmung
  26 February 2009.

- SF Schweizer Fernsehen, Schweizaktuell
  Fliegende Eisklötze
  3 March 2009.

- NewScientist
  Swiss paradise
  7 November 2009.

- New Delhi Television NDTV, http://www.ndtv.com/news/world/climate_change_frozen_in_time.php
  Climate change: Frozen in time
  23 November 2009.

Environmental Radionuclides Universität Bern

- Schweizer Fernsehen
  Tagessschau: Feinstaub-Studie
  http://www.sf.tv/sf1/tagesschau/index.php?docid=20090122
  22 January 2009.

- Schweizer Fernsehen
  10 vor 10: Es ist wieder Feinstaub-Saison
  http://www.sf.tv/sf1/10vor10/index.php?docid=20090122
  22 January 2009.

- NZZ Online
  Woher kommt der Feinstaub wirklich
  http://www.nzz.ch/nachrichten/panorama/woher_kommt_der_feinstaub_wirklich_1.1757227.html
  22 January 2009.

- soitu.es
  La nube de hollín que cubre media Asia
  http://www.soitu.es/soitu/2009/01/22/medioambiente/1232637846_130339.html
  22 January 2009.

- Tribune de Genève
  Le "Nuage brun d'Asie" disséqué au carbone 14
  23 January 2009.

- Radio SWR 2
  Campus: Braune Wolken über Asien
  24 January 2009.

- n-tv.de
  Rußpartikel aus Privathaushalten – Braune Wolke über Asien
  http://www.n-tv.de/1092874.html
  27 January 2009.

- BioChemie am Samstag, Uni Bern
  Vortrag S. Szidat: Ursachen und Risiken von Feinstaub
  24 October 2009.

BACHELOR THESIS

Benjamin Gasser
Isolierung von Huminsäuren und Cellulose aus Bodenproben für die AMS ^{14}C-Bestimmung
Dr. S. Szidat / Uni Bern
Prof. Dr. H.W. Gäggeler / PSI & Uni Bern
May 2009

Nicolas Millius
Molsiebfalle zum Einfangen von Kohlenstoffdioxid für anschliessende ^{14}C-Messung zur Feinstaubanalyse
Dr. S. Szidat / Uni Bern
Prof. Dr. H.W. Gäggeler / PSI & Uni Bern
May 2009

DOCTORAL THESIS

Nadzeya Homazava
Development of a novel microflow-capillary technique online hyphenated to the inductively coupled plasma mass spectrometry for the spatial- and time-resolved investigation of local corrosion
Prof. Dr. U. Krähenbühl / Uni Bern
May 2009

Anita Ciric
ENSO related climate variability recorded in an ice core from Cerro Mercedario, Central Andes
Prof. Dr. Margit Schwikowski / PSI & Uni Bern
Prof. Dr. H.W. Gäggeler / PSI & Uni Bern
October 2009

Michael Sigl
Ice core based reconstruction of past climate conditions from Colle Gnifetti, Swiss Alps
Prof. Dr. Margit Schwikowski / PSI & Uni Bern
Prof. Dr. H.W. Gäggeler / PSI & Uni Bern
October 2009

HABILITATION

Sönke Szidat
Source apportionment of carbonaceous particles in the atmosphere
Universität Bern, October 2009

TITULAR PROFESSOR

Margit Schwikowski
was awarded *titular professor* of the University of Bern
for her outstanding contributions to palaeo-climate science, October 2009

AWARDS

Sönke Szidat received the *Fritz-Strassmann-Preis*
by the Nuclear Chemistry Section of the German Chemical Society (GDCh)
for his achievements on the determination of the radionuclide ^{14}C in environmental samples with miniaturized accelerator mass spectrometry, September 2009

M. Sigl, H.W. Gäggeler, M. Schwikowski
Poster Award from the World Climate Research Program
The variability of $\delta^{18}O$ in an Alpine ice core reflects long-term trends of past summer (May-July) temperatures
10^{th} Swiss Global Change Day, Bern, Switzerland, 31 March 2009

LIST OF PUBLICATIONS 2009

Center for Radiopharmaceutical Sciences

UNIVERSITY LEVEL AND OTHER TEACHING

S.M. Ametamey
Einführung in die pharmazeutischen Wissenschaften I
ETH Zurich, HS09

R. Schibli
Metal Based Drug and Drug Development
ETH Zurich, FS09

R. Schibli
Practicum Medicinal Chemistry
ETH Zurich, HS09

P.A. Schubiger, S.M. Ametamey, R. Schibli
Einführung in die pharmazeutischen Wissenschaften II
ETH Zurich FS09

P.A. Schubiger, S.M. Ametamey, R. Schibli
Radiopharmazeutische Chemie
ETH Zurich FS09

P.A. Schubiger
CIMST Interdisciplinary Summer School
ETH Zurich, 2009

P.A. Schubiger. M.Rudin, P. Bösiger
Molecular Imaging Course Novartis
ETH Zurich ,2009

PUBLICATIONS

H. Struthers, Th.L. Mindt, R. Schibli
A new concept for the design of metal chelating systems using the copper catalyzed azide-alkyne cycloaddition
Dalton Transactions;49; 310-317 (2009)I

Th.L Mindt, C. Müller, F. Stuker, J.F. Salazar, A. Hohn, Th. Mueggler, M. Rudin , R. Schibli
A "Click Chemistry" Approach to the Efficient Synthesis of Multiple Imaging Probes Derived from a Single Precursor
Bioconjugate Chemistry;20;1940-1949 (2009)

A. Friedli, I. Novak-Hofer, S. Cohrs , K. Ballmer-Hofer, P.A. Schubiger, R. Schibli,
J. Grünberg
Anti-L1 cell adhesion molecule antibodies inactivate integrins on SKOV3ip human ovarian carcinoma cells in vitro and inhibit sL1-induced angiogenesis in vivo;;International
Journal of Cancer, 41;1572-1580 (2009)

C. Sparr, M. Michel, R:E. Marti, C. Müller, R. Schibli, R. Moser, V. Groehn
Synthesis of a Novel (g)-Folic Acid-N -Histidine-Conjugate Suitable for Labelling with 99mTc and 188Re;;
Synthesis, 5;787-792 (2009)

C. Müller, Th.L. Mindt, M. de Jong, R. Schibli;
Evaluation of a novel radiofolate in tumour-bearing mice:promising prospects for folate-based radionuclide therapy;
European Journal of Nuclear Medicine and Molecular Imaging, 36;938-946; (2009)

Th.L. Mindt, Ch. Schweinsberg, L. Brans, A. Hagbenbach, U. Abram, D. Tourwé, E. Garcia-Garayoa, R. Schibli
A Click Approach to Structurally Diverse Conjugates Containing a Central Di-1,2,3-triazole Metal Chelate
ChemMedChem, 4;529-539 (2009)

H. Struthers, A. Hagenbach, U. Abram, R. Schibli
Organometallic [Re(CO)3]+ and [Re(CO)2(NO)]2+ labeled substrates for human thymidine kinase
Inorganic Chemistry, 48;5154-5163 (2009)

T. Ebenhan, M. Honer, S.M. Ametamey, P:A. Schubiger, M. Becquet, S. Ferretti, C. Cannet, M. Rausch, P.M.J. McSheehy:
Comparison of [18F]-tracers in various experimental tumor models by PET imaging and identification of an early response biomarker for the novel microtubule stabilizer patupilone
Molecular Imaging & Biology, 11, 308-321 (2009).

A. Höhne, L. Yu, L. Mu, M. Reiher, U. Voigtmann, U. Klar, K. Graham, P. A. Schubiger, S. M. Ametamey
„Organnofluorosilanes as model compounds for 18F-labeled silicon-based PET tracers and their hydrolytic stability-experimental data and theoretical calculations „
Chemistry-A Europen Journal, 15, 3736-3743 (2009).

F. Hasler, O. F. Kuznetsova, R. N. Krasikova, T. Cservenyak, B.B. Quedow, F. X. Vollenweider, S. M. Ametamey, G. Westera
“*GMP-compliant synthesis of 18F-Altanserin and human plasma metabolic studies”*
J. Applied Radiation and Isotopes, 67, 598-601 (2009).

Ch. Lucatelli, M. Honer, T. Ross, J. -F. Salazar, P. A. Schubiger, S. M. Ametamey
“Synthesis, radiolabeling, in vitro and in vivo evaluation of 18F-PECMO as a PET ligand for imaging metabotropic glutamate receptor subtype 5”
Nucl. Med. Biology, 36, 613-622 (2009).

U. Roehn, J. Becaud, L. Mu, A. Srinivan, T. Stellfeld, A. Fitzner, K. Graham, L. Ludger, P. A. Schubiger, S. M. Ametamey
“Nucleophilic ring-opening of activated aziridines: A one-step method for labelling biomolecules with fluorine-18”
J Fluorine Chem. 130, 902-912 (2009).

S. Lehmann; D. Stiehl, M. Honer, M. Dominietto; R. Keist, I. Kotevic, K. Wollenick, S.M. Ametamey, R. Wenger, M. Rudin
Longitudinal and multimodal in vivo imaging of tumor hypoxia and its downstream molecular events
Proceedings of the National Academy of Sciences of the United States of America, 106 (33), 14004 - 14009, (2009)

CONFERENCE PROCEEDINGS

Th.L. Mindt
;A Click Chemistry Approach for the Development of Metallic Radiotracers and Therapeutic Agents
18th International Symposium of Radiopharmaceutical Sciences, Canada, Edmonton, August 2009

H. Struthers
The first technetium-labelled substrates for human thymidine kinase
18th International Symposium of Radiopharmaceutical Sciences, Canada, Edmonton, August 2009

E. Garcia-Garayoa
Tumor targeting with radiolabeled bombesin-nanoparticles
,Nanotechday Nordwestschweiz; Switzerland, Aarau, May 2009

E. Fischer
Comparison of 177-Lutetium and 161-Terbium labeled monoclonal antibody chCE7 for radioimmunotherapy
Annual Meeting European Association of Nuclear Medicine; Spain, Barcelona, October 2009

S. Lehenberger
Production and application of the low energy electron emitter Tb-161 for endoradiotherapy as a better alternative to Lu-177
Annual Meeting European Association of Nuclear Medicine, Spain, Barcelona, October 2009

E. Garcia-Garayoa
PEGylation of Bombesin analogues to increase their potential as tumor targeting radiopharmaceuticals
Annual Meeting European Association of Nuclear Medicine, Spain, Barcelona, October 2009

Th. L. Mindt
Click-to-Image: Development of Multiple Probes for Different Imaging Modalities and Therapeutic Agents from a Single Precursor
Annual Meeting European Association of Nuclear Medicine; Spain, Barcelona, October 2009

S. Däpp
PEGylation: a Strategy to improve the Tumour Targeting Potential of Bombesin Analogues
17th Arbeitstagung der Arbeitsgemeinschaft Radiochemie/Radiopharmazie, Germany, Schellerhau, September 2009

A. Hohn .
Recoil Loss of Cosmogenically Produced Helium and Neon in Presolar Grains
72nd Annual Meeting of the Meteoritical Society, France, Nancy, July 2009

DISSERTATIONS

H. Struthers
Syntheses and characterization of technetium and rhenium mixed nitrosyl-carbonyl complexes
Eidgenössische Technische Hochschule ETH Zürich, Nr: 18281, 2009

S. Jeger
Enzymatic functionalization of therapeutic proteins for tumor diagnosis and therapy
Eidgenössische Technische Hochschule ETH Zürich, Nr: 18696, 2009

INVITED TALKS

S.M. Ametamey
"Functional Imaging with PET tracers"
Axial PET Workshop, Zurich, Switzerland 6th February 2009

S.M. Ametamey
"Molecular imaging of small animals with PET"
10th Integrative Molecular Medicine, Mouse Physiology and Pathophysiology Zurich, Switzerland 2nd-3rd April, 2009

S.M. Ametamey
"Development of PET radiopharmaceuticals for the imaging of the brain"
Croatian Meeting of Chemists and Engineers summer school, Zagreb, Croatia, 19th -22nd April 2009

S.M. Ametamey
"Monitoring of Gene Therapy"
European Association of Nuclear Medicine Meeting, Barcelona, Spain, 10th -14th October 2009

S.M. Ametamey
"Molecular imaging in the brain"
ESMBR Course, Zurich, Switzerland, 19th -21st November 2009

P. A. Schubiger
Tumortargeting with radiolabelled Vitamine B12
Jahressymposium Forschungszentrum Jülich, 4 – 5 Mai 2009

R. Schibli.;
Homo Radiopharmaceuticus
A Passion for Elements and Radiation,
Farewell Symposium for Prof. Helmut Maecke, Switzerland, Basel, September 2009

R. Schibli.
Molecular Radiodiagnosis and Therapy: What Can Chemistry and Radiopharmacy Contribute?, Germany, Heidelberg, January 2009Seminars in Radiopharmacy
R. Schibli
Development of B12 Derivatives for Selective Cancer Cell Targeting, UK, Oxford, August 2009, Gordon Research Conference on Vitamin B12&Corphins

R. Schibli
Targeting of Tumors with Radiolabeled Vitamins, Germany, Frankfurt, September 2009, Jahrestagung Gesellschaft Deutscher Chemiker

R. Schibli
New Perspectives for the Development of Radiopharmaceuticals Using "Click"-Chemistry, Spain, Barcelona, October 2009, Annual Meeting European Association of Nuclear Medicine

R. Schibli
New Perspectives for the Development of Radiopharmaceuticals Using "Click"-Chemistry, UK, Manchester, April 2009, 37th Annual Meeting British Nuclear Medicine Society

R. Schibli
From bench to bedside: The promises of organometallic precursors of technetium-99m for nuclear diagnosis, USA Washington, August 2009, 238th National Meeting of the American Chemical Society

R. Schibli
Tumortherapie mit intelligenten Radiopharmaka, Switzerland, Herisau, January 2009, ETH im Dialog

R. Schibli
Nuclear imaging and therapy: What can radiopharmaceutical chemistry contribute to their success?, Switzerland, Zürich, March 2009, Tenure Lecture ETH Zürich

AWARDS

S. Daepp
Young Investigator prices
PEGylation: a Strategy to improve the Tumour Targeting Potential of Bombesin Analogues
17th Arbeitstagung der Arbeitsgemeinschaft Radiochemie/Radiopharmazie, Germany, Schellerhau, September 2009

LIST OF PUBLICATIONS 2009

NES – Nuclear Energy and Safety

Publications in Scientific and Technical Journals

AMMAR Y., REEKS M.[1]
"Agglomeration of inertial particles in a random rotating symmetric straining flow", Int. J. Multiphase Flow (ISSN 0301-9322), **35**, 840-853 (2009)
[1] University of Newcastle upon Tyne, UK

ATCHISON F., BLAU B., BOLLHALDER A., DAUM M., FIERLINGER P.[1], GELTENBORT P.[2], HAMPEL G.[3], KASPRZAK M.[4], KIRCH K., KÖCHLI S., KUCZEWSKI B.[5], LEBER H., LOCHER M., MEIER M., OCHSE S.[3], PLONKA C.[2], REISER R., WANG X., WIEHL N.[3], ZIMMER O.[1], ZSIGMOND G.
"Transmission of very slow neutrons through material foils and its influence on the design of ultracold neutron sources", Nucl. Instrum. Methods Phys. Res., Sect. A (ISSN 0168-9002), **608**, 144-151 (2009)
[1] TUM, Garching, DE
[2] Institut Laue-Langevin, Grenoble, FR
[3] Johannes Gutenberg University, Mainz, DE
[4] SMI, Vienna, AT
[5] Graz University of Technology, AT

BAKO B., ZAISER M.[1], WEYGAND D.[2], SAMARAS M., HOFFELNER W.
"Depinning transition of a dislocation line in ferritic oxide strengthened steels", J. Nucl. Mater. (ISSN 0022-3115), **385**, 284-290 (2009)
[1] University of Edinburgh, UK
[2] University of Karlsruhe, DE

BERTOLOTTO D., MANERA A., FREY S.[1], PRASSER H.M., CHAWLA R.
"Single-phase mixing studies by means of a directly coupled CFD/system-code tool", Ann. Nucl. Energy (ISSN 0306-4549), **36**(3), 310-316 (2009)
[1] ETHZ, Zurich, CH

BERTSCH J., KIRCH K., LAUSS B., ZUBLER R., GOELTL L.
"Neutron radiation hardness of vacuum-compatible two-component adhesives", Nucl. Instrum. Methods Phys. Res., Sect. A (ISSN 0168-583), **A 602**, 552-556 (2009)

BESSHO K.[1], DEGUELDRE C.
"Generation and sedimentation of colloidal bentonite particles in water", Appl. Clay Sci. (ISSN 0169-1317), **43**, 253-259 (2009)
[1] Japan Meteorological Agency/Meteorological Research Institute, Tsubaka, JP

BESTION, D.[1], ANGLART, H.[2], CARAGHIAUR, D.[2], PÉTURAUD, P.[3], SMITH, B.L., ANDREANI, M., NICENO, B., KREPPER, E.[4], LUCAS, D.[4], MORETTI, F.[5], GALASSI, M. [5], MACEK, J.[6], VYSKOCIL, L.[6], KONCAR, B.[7], HAZI, G.[8]
"Review of Available Data for Validation of NURESIM Two-Phase CFD Software Applied to CHF Investigations", Science and Technology of Nuclear Installations (ISSN 1687-6075), Article ID 214512, 14 pages (2009)
[1] CEA, Grenoble, FR
[2] KTH, Stockholm, SE
[3] EDF, Chatou, FR
[4] FZD, Rossendorf, DE
[5] Univ. Pisa, IT
[6] NRI, Rez, CZ
[7] JSI, Ljubljana, SL
[8] KFKI, Budapest, HU

BRADBURY M.H., BAEYENS B.
"Sorption modelling on illite, Part I: titration measurements and the sorption of Ni, Co, Eu and Sn", Geochim. Cosmochim. Acta (ISSN 0016-7037), **73**, 990-1003 (2009)

BRADBURY M.H., BAEYENS B.
"Sorption modelling on illite, Part II: actinide sorption and linear free energy relationships", Geochim. Cosmochim. Acta (ISSN 0016-7037), **73**, 1004-1013 (2009)

BRADBURY M.H., BAEYENS B.
"Experimental and modelling studies on the pH buffering of MX-80 bentonite porewater", Appl. Geochem. (ISSN 0883-2927), **24**, 419-425 (2009)

CAMMELLI S., DEGUELDRE C., KURI G., BERTSCH J., LÜTZENKIRCHEN-HECHT D.[1], FRAHM R.[1]
"Study of atomic clusters in neutron irradiated reactor pressure vessel surveillance samples by extended X-ray absorption fine structure spectroscopy", J. Nucl. Mater. (ISSN 0022-3115), **385**(2), 319-324 (2009)
[1] BUGH, Wuppertal, DE

CAMMELLI S., LÜTZENKIRCHEN-HECHT D.[1], BERTSCH J., DEGUELDRE C., FRAHM R.[1]
"Polydispersity and EXAFS simulations", J. Phys. (ISSN 0953-8984), **190**, 1-4 (2009)
[1] BUGH, Wuppertal, DE

CAMPITELLI E., SPÄTIG P.[1], BERTSCH J.
"Numerical investigation by finite element simulation of the ball punch test: application to tempered martensitic steels", J. Nucl. Mater. (ISSN 0022-3115), **386-388**, 319-322 (2009)
[1] EPFL, Lausanne, CH

CARAVATI S.[1,2], BERNASCONI M.[1], KÜHNE T. D.[2], KRACK M., PARRINELLO M.[2]
"Unravelling the Mechanism of Pressure Induced Amorphization of Phase Change Materials", Phys. Rev. Lett. (ISSN 0031-9007), **102**, 205502-1 – 205502-4 (2009)
1 University of Milano-Bicocca, IT
2 ETHZ, Zurich, CH

CARAVATI S.[1,2], BERNASCONI M.[1], KÜHNE T. D.[2], KRACK M., PARRINELLO M.[2]
"First-principles study of crystalline and amorphous Ge2Sb2Te5 and the effects of stoichiometric defects", J. Phys. Condensed Matter (ISSN 0953-8984), **21**, 255501-1 – 255501-14 (2009)
1 University of Milano-Bicocca, IT
2 ETHZ, Zurich, CH

CARUSO S., MURPHY M., JATUFF F., CHAWLA R.
"Determination of within-rod caesium and europium isotopic distributions in high burn-up fuel rods through computerised gamma-ray emission tomography", Nucl. Eng. Des. (ISSN 0029-5493), **239**, 1220-1228 (2009)

CHAHINE E., LABORDE P.[1], RENARD Y.[2]
"A Reduced Basis Enrichment for the Extended Finite Element Method", Math. Modell. Nat. Phen. (ISSN 0973-5348), **4**(1), 88-105 (2009)
[1] University of Toulouse, FR
[2] University of Lyon, FR

CHAWLA R.
"Editorial: PHYSOR 2008", Ann. Nucl. Energy (ISSN 0306-4549), **36**(3), 255-257 (2009)

CHEN J.C., HOFFELNER W.
"Irradiation creep of oxide-dispersion-strengthened (ODS) steels for advanced nuclear applications", J. Nucl. Mater. (ISSN 0022-3115), **392**, 360-363 (2009)

CHEN J.C., POUCHON M.A., JUNG P.[1]
"Irradiation creep and microstructural changes in an advanced ODS ferritic steel during helium implantation under stress", J. Nucl. Mater. (ISSN 0022-3115), **386-388**, 143-146 (2009)
[1] FZJ, Jülich, DE

CHENU A., MIKITYUK K., CHAWLA R.
"TRACE simulation of sodium boiling in pin bundle experiments under loss-of-flow conditions", Nucl. Eng. Des. (ISSN 0029-5493), **239**, 2417-2429 (2009)

CHURAKOV S.
"Structural position of H_2O molecules and hydrogen bonding in anomalous 11 Å tobermorite", Amer. Mineral. (ISSN 1945-3027), **94**, 156-166 (2009)

CHURAKOV S.
"Structure of the interlayer in normal 11 Å tobermorite from an ab initio study", Eur. J. Mineral. (ISSN 0949-4057), **21**, 261-271 (2009)

CURTI E., DÄHN R., FARGES F.[1], VESPA M.
"Na, Mg, Ni and Ca distribution and speciation after long-term alteration of simulated nuclear waste glass: a micro-XAS/XRF/XRF and wet chemical study", Geochim. Cosmochim. Acta (ISSN 0016-7037), **73**, 2283-2298 (2009)
[1] CNRS UMR, Paris, FR

DEGUELDRE C., AEBERHARD P., KUNZE P., BESSHO K.[1]
"Colloid generation/elimination dynamic processes: toward a pseudo-equilibrium", Colloid Surf. (ISSN 0927-7757), **337**, 117-126 (2009)
[1] Japan Meteorological Agency/Meteorological Research Institute, Tsubaka, JP

DEGUELDRE C., BOLEK M.
"Modelling plutonium association onto model colloids: the effect of pH and redox potential", Appl. Geochem. (ISSN 0883-2927), **24**, 310-318 (2009)

DEGUELDRE C., KURI G., BORCA C., GROLIMUND D.
"X-ray micro-fluorescence, diffraction and absorption spectroscopy for local structure investigation of a radioactive zinc ferrite deposit", Corros. Sci. (ISSN 0010-938X), **51**(8), 1690-1695 (2009)

DEGUELDRE C., LEE B.[1], OVERSBY V.[2], VAN WALLE E.[3]
"Editorial Note", J. Nucl. Mater. (ISSN 0022-3115), **385**(2), vii-viii (2009)
[1] Imperial College, London, UK
[2] VMO Konsult, Stockholm, SE
[3] SCK-CEN, Mol, BE

DEGUELDRE C., RAABE J., WOLD S.[1]
"Morphologic investigations of clay colloid aggregates by scanning transmission X-ray micro-spectroscopy", Earth Planet. Sci. Lett. (ISSN 0012-821X), **24**, 2015-2018 (2009)
[1] KTH, Stockholm, SE

DEGUELDRE C., RAABE J., WOLD S.[1]
"Investigations of clay colloid aggregates by scanning transmission X-ray micro-spectroscopy of suspensions", Appl. Geochem. (ISSN 0883-2927), **24**(10), 2015-2018 (2009)
[1] KTH, Stockholm, SE

DEHBI A.
"A stochastic Langevin model of turbulent particle dispersion in the presence of thermophoresis", Int. J. Multiphase Flow (ISSN 0301-9322), **35**, 219-266 (2009)

DHOTRE M., NICENO B., SMITH B.L., SIMIANO M.
"Large-eddy simulation (LES) of the large scale bubble plume", Chem. Eng. Sci. (ISSN 0009-2509), **64**(11), 2692-2704 (2009)

DURIEZ C.[1], STEINBRÜCK J.[2], OHAI D.[3], MELEG T.[3], BIRCHLEY J., HASTE T.[4]
"Separate-effect tests on zirconium cladding degradation in air ingress situations", Nucl. Eng. Des. (ISSN 0029-5493), **239**(2), 244-253 (2009)
[1] IRSN, Aix-en-Provence, FR
[2] FZK, Karlsruhe, DE
[3] INRNE, Sofia, RO
[4] IRSN, Cadarache, FR

FERROUKHI H., HOLLARD J.M., ZIMMERMANN M.A., CHAWLA R.
"Estimation of the fast neutron fluence at control rod tips using a 3D-diffusion/2D transport multi-step calculation scheme", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 286-291 (2009)

FERROUKHI H., ZERKAK O., CHAWLA R.
"Cross-section modelling effects on Pressurised Water Reactor main-steam-line-break analyses", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 1184-1200 (2009)

FERROUKHI H., ZIMMERMANN M.A.
"Study of the PWR REA pulse width for realistic UO_2 and MOX core designs using 3D kinetic methods", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 1170-1183 (2009)

FROIDEVAL A., ABOLHASSANI-DADRAS S., GAVILLET D., GROLIMUND D., BORCA C., KRBANJEVIC J., DEGUELDRE C.
"Microprobe analysis of neutron irradiated and autoclaved zirconium niobium claddings using synchrotron-based hard X-ray imaging and spectroscopy", J. Nucl. Mater. (ISSN 0022-3115), **385**(2), 346-350 (2009)

FROIDEVAL A., SAMARAS M., IGLESIAS R., POUCHON M.A., CHEN J.C., GROLIMUND D., VICTORIA M., HOFFELNER W., RAABE J., SCHUPPLER S.[1]
"Application of synchrotron radiation techniques for model validation of advanced structural materials", Adv. Eng. Mater. (ISSN 1438-1656), **11**, 459-463 (2009)
[1] FZK, Karlsruhe, DE

GAO N., FU C.[1], SAMARAS M., SCHÄUBLIN R.[2], VICTORIA M., HOFFELNER W.
"'Multiscale modelling of bi-crystal grain boundaries in bcc-iron'", J. Nucl. Mater. (ISSN 0022-3115), **385**(2), 262-266 (2009)
[1] CEA, Saclay, FR
[2] EPFL, Lausanne, CH

GARCIA-GARCIA S.[1], DEGUELDRE C., WOLD S.[1]
"Determining pseudo-equilibrium of montmorillonite colloids in generation and sedimentation experiments as a function of ionic strength, cationic form, and elevation", J. Colloid Interface Sci. (ISSN 0021-9797), **335(1)**, 54-61 (2009)
[1] KTH, Stockholm, SE

GONZALEZ F., GIMMI T., JURANJI F.[1], VAN LOON L.R., DIAMOND L.[2]
"Linking the diffusion of water in compacted clays at two different time scales: tracer through-diffusion and quasielastic neutron scattering", Environ. Sci. Technol. (ISSN 0944-1344), **43**, 3487-3493 (2009)
[1] University of Saarbrücken, DE
[2] University of Berne, CH

GOOD N.[1], BALTENSPERGER U., TOPPING D.[1], DUPLISSY J., GYSEL M., MEYER N., METZGER A., TURNER S.[1], MCFIGGANS G.[1], RISTOVSKI Z.[2], WEINGARTNER E., COE H.[1]
"Widening the gap between measurement and modelling of secondary organic aerosol", Atmos. Chem. & Phys. Discussions (ISSN 1680-7367), **9**, 22619-22657 (2009)
[1] University of Manchester, UK
[2] Queensland University of Technology, Brisbane, AU

HASTE T.[1], GIORDANO P.[2], HERRANZ L.[3], GIRAULT N.[4], DUBOURG R.[2], SABROUX J.C.[4], CANTREL L.[2], BOTTOMELY D.[5], PAROZZI F.[4], AUVINEN A.[6], DICKINSON S.[7], LAMY J.S.[7], WEBER G.[6], ALBIOL T.[1]
"SARNET Integrated European Severe Accident Research — Conclusions in the Source Term Area", Nucl. Eng. Des. (ISSN 0029-5493), **239**(12), 3116-3131 (2009)
[1] IRSN, Cadarache, FR
[2] IRSN, St Paul lez Durance, FR
[3] CIEMAT, Madrid, ES
[4] IRSN, Fontenay-aux-Roses, FR
[5] JRC/ITU, Karlsruhe, DE
[6] VTT Energy, Espoo, FI
[7] AEA-T, Winfrith, UK

HUBER F.[1], KIENZLER B.[1], LÜTZENKIRCHEN J.[1], PFINGSTEN W., TIFFREAU C.[2]
"Karlsruhe Geochemical Workshop TRePro II 2009: Workshop on Modelling of Coupled Transport Reaction Processes", atw – Int. Z. Kernenerg. (ISSN 1431-5254), **54**, 478-479 (2009)
[1] FZK, Karlsruhe, DE
[2] IRSN, St Paul lez Durance, FR

JAKOB A., PFINGSTEN W., VAN LOON L.R.
"Effects of sorption competition on caesium diffusion through compacted argillaceous rock", Geochim. Cosmochim. Acta (ISSN 0016-7037), **73**, 2441-2456 (2009)

JANSSENS K., NIFFENEGGER M., REICHLIN K.
"A computational fatigue analysis of cyclic thermal shock in notched specimens", Nucl. Eng. Des. (ISSN 0029-5493), **239**, 36-44 (2009)

JATUFF F., PERRET G., MURPHY M., GIUST F.[1], CHAWLA R.
"Void reactivity coefficient benchmark results for a 10x10 BWR assembly in the full 0–100% void fraction range", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 853-858 (2009)
[1] NOK AG, Baden, CH

JURANJI F.[1], GONZALEZ F., GIMMI T., VAN LOON L.R., DIAMOND L.[2]
"Linking the diffusion of water in clays at different time and length scales: insights form quasi-elastic neutron scattering and tracer through-diffusion", Swiss Neutron News (ISSN 1931-7352), **35**, 4-9 (2009)
[1] University of Saarbrucken, DE
[2] University of Berne, CH

KOSAKOWSKI G., BLUM P.[1], KULIK D., PFINGSTEN W., SHAO H.[1], SINGH A.
"Evolution of a generic clay/cement interface. First reactive transport calculations utilizing a Gibbs energy minimization based approach for geochemical calculations", J. Environ. Sci. Sust. Soc. (ISSN 1881-5073), **3**, 41-49 (2009)
[1] University of Tübingen, DE

KREPEL J., PELLONI S., MIKITYUK K., CODDINGTON P.
"EQL3D: ERANOS-based equilibrium fuel-cycle procedure for fast reactors", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 550-561 (2009)

KULIK D.
"Thermodynamic concepts of modeling sorption at the mineral-water interface", Rev. Mineral. Geochem. (ISSN 1529-6466), **70**, 125-180 (2009)

KURI G., CAMMELLI S., DEGUELDRE C., BERTSCH J., GAVILLET D.
"Neutron-induced damage in reactor pressure vessel steel: an X-ray absorption fine-structure study", J. Nucl. Mater. (ISSN 0022-3115), **385**(2), 312-318 (2009)

LIAO Y., GUENTAY S.
"Potential Steam Generator Tube Rupture in the Presence of Severe Accident Thermal Challenge and Tube Flaws due to Foreign-Object Wear", Nucl. Eng. Des. (ISSN 0029-5493), **239**, 1128-1135 (2009)

LIAO Y., GUENTAY S., SUCKOW D., DEHBI A.
"Reflux Condensation of Flowing Vapour and Non-Condensable Gases Counter-Current to Laminar Liquid Film in a Vertical Flow", Nucl. Eng. Des. (ISSN 0029-5493), **239**, 2409-2416 (2009)

LIAO Y., VIEROW K.[1]
"Variable Property Effects on Vapor Condensation with a Noncondensable Gas", Nucl. Technol. (ISSN 0029-5450), **167**, 13-19 (2009)
[1] Texas A&M University, College Station, US

LIU L.-M.[1], KRACK M., MICHAELIDES A.[1]
"Interfacial water: a first principles molecular dynamics study of a nanoscale water film on salt", J. Chem. Phys. (ISSN 0021-9606), **130**, 234702-1 –.234702-12 (2009)
1 UC, University of London, UK

LUCAS, D.[1], BESTION, D.[2], BODÈLE, E.[1], COSTE, P.[2], SCHEUERER, M.[3], D'AURIA, F.[4], MAZZINI, D.[4], SMITH, B.L., TISELJ, I.[5], MARTIN, A.[6], LAKAHAL, D.[7], SEYNHAEVE, J.M.[8], KYRKI-RAJAMÄKI, R.[9], ILVONEN, M.[10], MACEK, J.[11]
"An Overview of the Pressurized Thermal Shock Issue in the Context of the NURESIM Project", Science and Technology of Nuclear Installations, (ISSN 1687-6075), Article ID 583259, 13 pages (2009)
[1] FZD, Rosseldorf, DE
[2] CEA, Grenoble, FR
[3] GRS, Garching, DE
[4] Univ. Pisa, IT
[5] JSI, Ljubljana, SL
[6] EDF, Chatou, FR
[7] ASCOMP, Zurich, CH
[8] UCL, Louvain, BE
[8] EDF, Chatou, FR
[9] LUT, Lappeenranta, FI
[10] VTT, Espoo, FI
[11] NRI, Rez, CZ

MANDALIEV P., DÄHN R., WEHRLI B.[1], WIELAND E.
"Macro- and micro-spectroscopic study of Nd(III) uptake mechanisms in hardened cement paste", Environ. Sci. Technol. (ISSN 0944-1344), **43**, 8462-8468 (2009)
[1] ETHZ, Zurich, CH

MANERA A., OZAR B.[1], PARANJAPE S.[1], ISHII M.[1], PRASSER H.-M.
"Comparison between wire-mesh sensors and conductive needle probes for measurements of two-phase flow parameters", Nucl. Eng. Des. (ISSN 0029-5493),**239**(9), 1718-1724 (2009)
[1] Purdue University, US

MCDERMOTT C.[1], WALSH R.[2], METTIER R., KOSAKOWSKI G., KOLDITZ O.[1]
"Hybrid-analytical and finite-element numerical modelling of mass and heat transport in fractured rocks with matrix diffusion", Comp. Geosci. (ISSN 1420-0597), **13**, 349-361 (2009)
[1] University of Tübingen, DE
[2] INTERA, Ottawa, CA

MIKITYUK K.
"Heat transfer to liquid metal: review of data and correlations for tube bundles", Nucl. Eng. Des. (ISSN 0029-5493), **239**, 680-687 (2009)

NICENO B., BOUCKER M.[1], SMITH B.L.
"Euler-Euler Large Eddy Simulation (EELES) of a Square Cross-Sectional Bubble Column using the NURESIM CFD Platform", Science and Technology of Nuclear Installations (ISSN 1687-6075), Article ID 410272, 8 pages (2009)
[1] EDF, Chatou, FR

NIFFENEGGER M., LEBER H.
"Monitoring the Embrittlement of Reactor Pressure Vessel Steels by using the Seebeck Coefficient", J. Nucl. Mater. (ISSN 0022-3115), **389**, 32-67 (2009)

PEKALA M.[1], KRAMERS J.[1], WABER N.[1], GIMMI T., ALT-EPPING P.[1]
"Transport of ^{234}U in the Opalinus Clay at centimetre to decimetre scales", Appl. Geochem. (ISSN 0883-2927), **24**, 138-152 (2009)
[1] University of Berne, CH

PERRET G., MURPHY M., JATUFF F., SUBLET J.C.[1], BOULAND O.[1], CHAWLA R.
"Impact of New Gadolinium Cross-Sections on Reaction Rate Distributions in 10x10 BWR Assemblies", Nucl. Sci. Eng. (ISSN 0029-5639), **163**, 17-25 (2009)
[1] CEA, Cadarache, FR

PETKEVIC P., MIKITYUK K., CODDINGTON P., CHAWLA R.
"Development and benchmarking of a mechanical model for GFR plate-type fuel", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 1262-1269 (2009)

PLASCHY M.[1], MURPHY M., JATUFF F., LÜTHI A., GRIMM P., JACOT-GUILLARMOD R.[2], GIUST F.[2], BERGMANN U., HELMERSSON S.[3], SEILER R., KROUTHÉN J.[2], CHAWLA R.
"Experimental Validation of Reaction-Rate Distributions for a SVEA-96+ BWR Assembly with Hafnium Control Blades", J. Nucl. Sci. and Techn. (ISSN 0022-3131), **46**(9), 933-943 (2009)
[1] EOS, Lausanne, CH
[2] NOK AG, Baden, CH
[3] Westinghouse Atom AG, Västeras, SE

PLASCHY M.[1], MURPHY M., JATUFF F., PERRET G., SEILER R., CHAWLA R.
"Validation of Monte Carlo predictions of LWR-PROTEUS safety parameters using an improved whole-reactor model", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 1536-1543 (2009)
[1] EOS, Lausanne, CH

POPOV D., BULEON A.[1], BURGHAMMER M.[2], CHANZY H.[3], MONTESANTI N.[3], PUTAUX J.[3], POTOCKI-VERONESE G.[4], RIEKEL C.[2]
"Crystal structure of A-amylose: a revisit from synchrotron micro-diffraction analysis of single crystals", Macromolecules (ISSN 0024-9297), **42**, 1167-1174 (2009)
[1] INRA, Paris, FR
[2] ESRF, Grenoble, FR
[3] CERMAV-CNRS, Grenoble, FR
[4] LISBP, Toulouse, FR

PURANEN A.[1], JONSSON A.[2], DÄHN R., CUI D.[3]
"Immobilization of selenate by iron in aqueous solution under anoxic conditions and the influence of uranyl", J. Nucl. Mater. (ISSN 0022-3115), **392**, 519-524 (2009)
[1] KTH, Stockholm, SE
[2] Aachen University of Technology, DE
[3] Studsvik Nuclear AB, Nyköping, SE

POUCHON M.A., CHEN J.C., FROIDEVAL A., JANOUSCH M., DEGUELDRE C.
"Irradiation effects in helium-implanted silicon carbide measured by X-ray absorption spectrometry", J. Nucl. Mater. (ISSN 0022-3115), **385**(2), 299-303 (2009)

POUCHON M.A., CHEN J.C., HOFFELNER W.
"Micro-characterization of damage in materials for advanced nuclear fission plants", Adv. Mater. Res. (ISSN 1662-8985), **59**, 269-274 (2009)

POUCHON M.A., CHEN J.C., HOFFELNER W.
"He implantation-induced microstructure- and hardness-modification of the intermetallic γ-TiAl", Nucl. Instrum. Methods Phys. Res., Sect. B (ISSN 0168-583), **267**(8-9), 1500-1504 (2009)

POUCHON M.A., TALAMO A.[1], VENNERI F.[2]
"Alternative configurations for the QUADRISO fuel design concept", J. Nucl. Mater. (ISSN 0022-3115), **383**(3), 264-266 (2009)
[1] ANL, Argonne, US
[2] LOGOS, Los Alamos, US

RESTANI R., MARTIN M., KIVEL N., GAVILLET D.
"Analytical investigations of irradiated inert matrix fuel", J. Nucl. Mater. (ISSN 0022-3115), **385**, 435-442 (2009)

RICHTER S.[1], ALONSO A.[1], AREGBE Y.[1], EYKENS R.[1], KEHOE F.[1], KÜHN H.[1], KIVEL N., VERBRUGGEN A.[1], WELLUM R.[1], TAYLOR P.[1]
"A new series of uranium isotope reference materials for investigating the linearity of secondary electron multipliers in isotope mass spectrometry", Intern. J. of Mass Spectrometry (ISSN 1387-3806), **281**, 115-125 (2009)
[1] IRMM, Geel, BE

RIEKEL C.[1], BURGHAMMER M.[1], DAVIES R.[1], GEBHARDT R.[1], POPOV D.
"Fundaments of soft condensed matter diffraction with microfocus techniques", Lect. Notes Phys. (ISSN 1616-6137), **776**, 91-104 (2009)
[1] ESRF, Grenoble, FR

RISTOVSKI Z.[1], MEYER N., SUNI T.[2], KULMALA M.[2], BOY M.[2], DUPLISSY J.[1], BALTENSPERGER U., TURNIPSEED A.[3], MORAWSKA L.[4]
"The role of sulphates and organic vapours in new particle formation in a eucalypt forest", Atmos. Chem. & Phys. Discussions (ISSN 1680-7367), **9**, 17793-17815 (2009)
[1] Aachen University of Technology, DE
[2] University of Helsinki, FI
[3] NCAR/ACD, Boulder, US
[4] Queensland University of Technology, Brisbane, AU

RITTER S., MOLANDER A.[1]
"Editorial: Corrosion Monitoring in Nuclear Power Plants", Energy Materials (ISSN 1748-9237), **3**(2), 57-58 (2009)
[1] Studsvik Ecosafe, Nykoping, SE

RITTER S., SEIFERT H.P.
"Detection of Stress Corrosion Cracking in a Simulated BWR Environment by Combined Electrochemical Noise and Direct-Current Potential-Drop Measurements", Energy Materials (ISSN 1748-9237), **3**(2), 72-80 (2009)

ROZOV K., BERNER U., TAVIOT-GUEHO C.[1], LEROUX F.[2], RENAUDIN G.[2], KULIK D., DIAMOND L.[3]
"Synthesis and characterization of the LDH hydrotalcite–pyroaurite solid-solution series", Cem. Concr. Res. (ISSN 0008-8846), doi.org/10.1016/j.cemconres.2009.08.031 (2009)
[1] University Blaise Pascal, Clermont-Ferrand, FR
[2] CNRS, Grenoble, FR
[3] University of Berne, CH

RUGEL G.[1], FAESTERMANN T.[1], KNIE K.[1], KORSCHINEK G.[1], POUTIVTSEV M.[1], SCHUMANN D., KIVEL N., GÜNTHER-LEOPOLD I., WEINREICH R., WOHLMUTHER M.
"New Measurement of the ^{60}Fe Half-Life", Phys. Rev. Lett. (ISSN 157002), **103**, 072502-1-4, 4 pages (2009)
[1] Technical University Munich, Garching, DE

SAMARAS M., NANSTAD R.[1], ALLEN T.[2], BURLET H.[3]
"Advanced structural materials and cladding", MRS Bulletin (ISSN 0883-7694), **34**, 20-25 (2009)
[1] ORNL, Oak Ridge, US
[2] University of Wisconsin, US
[3] CEA, Grenoble, FR

SAMARAS M., VICTORIA M., HOFFELNER W.
"Nuclear Energy Materials Prediction: Application of the Multiscale Modelling Paradigm", Nucl. Eng. Technol. (ISSN 1738-5733), **41**, 1-6 (2009)

SEPOLD L.[1], LIND T., PINTÉR CSORDÁS A.[2], STEGMAIER U.[1], STEINBRÜCK J.[1], STUCKERT J.[1]
"AgInCd Control Rod Failure in the QUENCH-13 Bundle Test", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 1349-1359 (2009)
[1] FZK, Karlsruhe, DE
[2] KFKI, Budapest, HU

SHAO H.[1], DMYTRIEVA S.[2], KOLDITZ O.[1], KULIK D., PFINGSTEN W., KOSAKOWSKI G.
"Modelling reactive transport in a non-ideal aqueous/solid solution system", Appl. Geochem. (ISSN 0883-2927), **24**, 1287-1300 (2009)
[1] University of Tübingen, DE
[2] SSE Technocentre, Kyiv, UA

SHAO H.[1], KULIK D., BERNER U., KOSAKOWSKI G., KOLDITZ O.[1]
"Modeling the competition between solid solution formation and cation exchange on the retardation of aqueous radium in an idealized bentonite column", Geochem. J. (ISSN 1730-413X), **43**, 37-42 (2009)
[1] University of Tübingen, DE

SHEPEL S.V.[1], SMITH B.L.
"On Surface Tension Modelling using the Level Set Method", Int. J. Num. Meth. Fluids (ISSN: 0271-2091), 59, 147-171 (2009)
[1] Now at EMPA, Dübendorf, CH

SIMIANO, M.[1], LAKEHAL D.[2], LANCE M.[3], YADIGAROGLU, G.[2]
"Turbulent Transport Mechnisms in oscillating bubble plumes", J. Fluid Mech. (ISSN: 0022-1120), **633**, 191-231 (2009)
[1] Now at ALSTOM, Baden, CH
[2] ASCOMP, Zurich, CH
[3] University of Lyon, FR

SMITH B.L.
"Adaptation of the Law of the Wall Boundary Treatment to include Volumetric Heating Effects", Appl. Math. Modelling (ISSN: 0307-904X), 33, 1306-1322 (2009)

SMITH B.L., DURY T.V., NI L., ZUCCHINI A.[1]
"Computational Fluid Dynamics Studies of the Lower MEGAPIE Spallation Source Target and Safety Vessel", J. Nucl. Sci. Technol. (ISSN 0022-3131), **45**(12), 1334-1346 (2009)
[1] ENEA, Bologna, IT

STAINSBY R.[1], PEERS K.[1], MITCHELL C.[1], POETTE C.[2], MIKITYUK K., SOMERS J.[3]
"Gas-Cooled Fast Reactor Research and Development in the European Union", Science and Technology of Nuclear Installations (ISSN 1687-6075), Article ID 238624, 7 pages (2009)
[1] AMEC NCC Ltd., Knutsford, UK
[2] CEA, Cadarache, FR
[3] ITU, Karlsruhe, DE

STUCKERT J.[1], BIRCHLEY J., GROSSE M., HASTE T.[2], SEPOLD L.[1], STEINBRÜCK J.[1]
"Experimental and post-test calculation results of the integral reflood test QUENCH-12 with a VVER-type bundle", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 183-192 (2009)
[1] FZK, Karlsruhe, DE
[2] IRSN, Cadarache, FR

TSUZUKI N.[1], KATO Y.[2], NIKITIN K., ISHIZUKA T.[1]
"Advanced Mirco-Channel Heat Exchanger with S-Shaped Fins", J. Nucl. Sci. Techn. (ISSN 0022-3131), **46**(5), 403-412 (2009)
[1] Tokyo Institute of Technology, JP
[2] MCX Institute Inc., Tokyo, JP

ULDRY A.C., HUNG I.[1], BECKER-BALDUS J.[1], WEBBER A.L.[1], WONG A.[1], SMITH M.E.[1], JOYCE S.A.[2], YATES J.R.[3], PICKARD J.[4], DUPREE R.[1], BROWN S.P.[1]
"Probing Heteronuclear 15N−17O and 13C−17O Connectivities and Proximities by Solid-State NMR Spectroscopy", J. Am. Chem. Soc. (ISSN 0002-7863), **131**(5), 1820-1834 (2009)
[1] University of Warwick, UK
[2] TNI, Tyndall, UK
[3] University of Cambridge, UK
[4] University of Zurich, CH

VAN LOON L.R., BAEYENS B., BRADBURY M.H.
"The sorption behaviour of caesium on Opalinus Clay: a comparison between intact and crushed material", Appl. Geochem. (ISSN 0883-2927), **24**, 999-1004 (2009)

VOLKRINGER C.[1], LOISEAU T.[1], GUILLOU N.[1], FEREY G.[1], HAOUAS M.[1], AUDEBRAND N.[1], MARGIOLAKI I.[2], POPOV D., BURGHAMMER M.[2], RIEKEL C.[2]
"Structural transitions and flexibility during dehydration-rehydration process in the MOF-type aluminum pyromellitate Al2(OH)2[C10O8H2] (MIL-118)", Cryst. Growth Des. (ISSN 0022-0248), **9**, 2927-2936 (2009)
[1] Institute Lavoisier, Versailles, FR
[2] ESRF, Grenoble, FR

WALKER C.[1], BRÉMIER S.[2], PORTIER S., HASNAOUI R.[2], GOLL W.[3]
"SIMS analysis of an UO_2 fuel irradiated at low temperature to 65 MWd/kgHM", J. Nucl. Mater. (ISSN 0022-3115), **393**, 212-223 (2009)
[1] JRC, Karlsruhe, DE
[2] ITU, Karlsruhe, DE
[3] AREVA NP GmbH, Erlangen, DE

WALKER C.[1], SIMIANO M., ZBORAY R., PRASSER H.M.
"Investigations on Mixing Phenomena in Single-Phase Flow in a T-Junction Geometry", Nucl. Eng. Des. (ISSN 0029-5493), **239**, 116-126 (2009)
[1] JRC, Karlsruhe, DE

WANG W.[1], KOSAKOWSKI G., KOLDITZ O.[1]
"A parallel finite element scheme for thermo-hydro-mechanical (THM) coupled problems in porous media", Comput. Geosci.(ISSN 1420-0597), **35**, 1631-1641 (2009)
[1] University of Tübingen, DE

WU T.[1], AMAYRI S.[1], DREBERT J.[1], VAN LOON L.R., REICH T.[1]
"Neptunium(V) sorption and diffusion in Opalinus Clay", Environ. Sci. Technol. (ISSN 0944-1344), **43**, 6567-6571 (2009)
[1] Johannes Gutenberg University, Mainz, DE

YAROSCHCHUK A.[1], GLAUS M., VAN LOON L.R., REICH T.[2]
"Determination of diffusion and sorption parameters of thin confined layers by direct fitting of through-diffusion flux", J. Colloid Interface Sci. (ISSN 0021-9797), **337**, 508-512 (2009)
[1] University of Catalonia, Barcelona, ES
[2] Johannes Gutenberg University, Mainz, DE

Keynote Lectures at International Conferences

CAVEDON J.M.
"International Research in Generation IV Systems: Progress made in Achieving the Technology Goals for Industry and Society", Invited Talk, 7th Eur. Commission Conf. on Euratom Research and Training in Reactor Systems (FISA 2009), Prague, Czech Republic, 23 June 2009

SMITH B. L.
"Assessment of CFD for NRS", OECD/NEA-IAEA Joint Conf. on Experiments and CFD Code Applications to Nuclear Reactor Safety (XCFD4NRS), 10-12 September 2008, Grenoble, France, CD-ROM, 2009

International Conferences with Proceedings

ANDREANI M., PALADINO D., GEORGE T.[1]
"On the Unexpectedly Large Effect of the Re-Vaporization of the Condensate Liquid Film on Two Tests in the PANDA Facility Revealed by Simulations with the GOTHIC Code", OECD/NEA-IAEA Joint Conf. on Experiments and CFD Code Applications to Nuclear Reactor Safety (XCFD4NRS), 10-12 September 2008, Grenoble, France, CD-ROM, 2009
[1] NAI, Richland, US

ANZIEU P.[1], STAINSBY R.[2], MIKITYUK K.
"Gas-Cooled Fast Reactor (GFR): Overview and Perspectives", GIF Symposium, 9-10 September 2009, Paris, France, 127-134, 2009 (ISBN 978-92-64-99115.6)
[1] CEA, Cadarache, FR
[2] AMEC NCC Ltd., Knutsford, UK

ARTIOLI C.[1], GRASSO G.[2], SAROTTO M.[1], KREPEL J.
"ELSY Neutronic Analysis by Deterministic and Monte Carlo Methods: an Innovative Concept for the Control Rod System", Paper 9244, 2009 Int. Congr. on Advances in Nuclear Power Plants (ICAPP'09), 10-14 May 2009, Tokyo, Japan, CD-ROM, 2009
[1] ENEA, Rome, IT
[2] University of Bologna, IT

BAE Y.Y.[1], L.K.H. LEUNG L.K.H.[2], LYCKLAMA À NIJEHOLT J.A.[3], ANDREANI M., SCHULENBERG T.[4] , J. STARFLINGER J.[4], ISHIWATARI Y.[5], OKA Y.[5], MORI H.[6], EZATO K.[7]
"Status of Ongoing Research on SCWR Thermal Hydraulics and Safety", GIF Symp. 2009, pp. 149-162, 9-10 September, 2009, Paris, France (ISBN 978-92-6499115-6)
[1] KAERI, Daejeon, KR
[2] AECL, Chalk River, CA
[3] NRG, Petten, NL
[4] FZK, Karlesruhe, DE
[5] University of Tokyo, JP
[6] University of Kyushu, JP
[7] JAERI, Naka-shi, JP

BECHTA S.[1], KRUSHINOV Y.[1], VITOL S.[1], KOTOVA S.[1], SULATSKIY A.[1], KAELLVENIUS G.[2], GUSAROV V.[3], ALMYASHEV V.[3], DUCROS G.[4], JOURNEAU C.[5], BOTTOMELY D.[6], CLEMENT B.[7], HERRANZ L.[8], GUENTAY S., TRAMBAUER K.[9], AUVINEN A.[10]
"Influence of corium oxidation on fission product release from a molten pool", Paper 9145, 2009 Int. Congr. on Advances in Nuclear Power Plants (ICAPP'09), 10-14 May 2009, Tokyo, Japan, CD-ROM, 2009
[1] NITI, Sosnovy, RU
[2] Chalmers University of Technology, Gotheburg, SE
[3] ISC RAS, St. Petersburg, RU
[4] CEA, Cadarache, FR
[5] CEA, Grenoble, FR
[6] JRC/ITU, Karlsruhe, DE
[7] IRSN, Cadarache, FR
[8] CIEMAT, Madrid, ES
[9] GRS, Garching, DE
[10] VTT Energy, Espoo, FI

BERTSCH J., ZUBLER R.
"The Influence of Non-Standard Testing on Fracture Toughness of Fuel Cladding", Paper 2103, 2009 Water Reactor Fuel Performance Meeting (TOPFUEL 2009), 6-10 September 2009, Paris, France, CD-ROM, 2009

BIRCHLEY J.
Preliminary analyses of QUENCH-ACM experiments using SCDAP/RELAP5, 15th Int. QUENCH Workshop, 3-5 November 2009, Karlsruhe, Germany, CD-ROM, 2009 (ISBN: 978-3-923704-71-2)

BIRCHLEY J., HASTE T.[1]
"Modelling of Zircaloy Oxidation in Air", Int. Techn. Workshop on Computational and Experimental Studies of LWR Fuel Element Behaviour under Beyond Design Basis Accidents and Reflood, 27-28 July 2009, Moscow, Russian Federation, CD-ROM, 2009
[1] IRSN, Cadarache, FR

BIRCHLEY J., HASTE T.[1]
"Modelling of Zircaloy Oxidation in Air", Cooperative Severe Accident Research Program (CSARP) Technical Review Meeting, 15-18 September 2009, Bethesda, US, CD-ROM, 2009
[1] IRSN, Cadarache, FR

BIRCHLEY J., HASTE T.[1], JAECKEL B.S., STEINBRÜCK J.[2], STUCKERT J.[2]
"Post-test Analysis of QUENCH1-3 Bundle Test Including Ag-In-Cd Absorber Rod", Paper 9011, 2009 Int. Congr. on Advances in Nuclear Power Plants (ICAPP'09), 10-14 May 2009, Tokyo, Japan, CD-ROM, 2009
[1] IRSN, Cadarache, FR
[2] FZK, Karlsruhe, DE

BIRCHLEY J., JAECKEL B.S., HASTE T[1]., STEINBRÜCK J.[2], STUCKERT J.[2]
"Analysis of the QUENCH-14 Bundle Test with M5® Cladding", Paper 75099, 17th Int. Conf. on Nucl. Eng. (ICONE-17), 12-16 July 2009, Brussels, Belgium, CD-ROM, 2009 (ISBN 987-0-7918-3852-5)
[1] IRSN, Cadarache, FR
[2] FZK, Karlsruhe, DE

BITTERMANN J.[1], SCHULENBERG, T.[2], ANDREANI, M.
[1] AREVA NP, Erlangen, DE
[2] FZK, Karlsruhe, DE
"The Safety Concept of the HPLWR", 4th Int. Symp. Supercritical Water-Cooled Reactors, 8-11 March, 2009, Heidelberg, Germany, CD-ROM, 2009
[1] IRSN, Cadarache, FR

BRUNEL L.[1], CHAUVIN N.[2], MIZUNO T.[3], POUCHON M.A., SOMERS J.[4]
"The Generation IV Project: GFR Fuel and other Core Materials, GIF Symposium, 9-10 September 2009, Paris, France, Vol. 1, 135-141, 2009 (ISBN 978-92-64-99115-6)
[1] AREVA NP, Paris, FR
[2] CEA, Marcoule, FR
[3] JAEA, Tokai-mura, JP
[4] JRC, Ispra, IT

CHAHINE E.
"Integral matching XFEM: a way to improve the XFEM approximation by avoiding blending elements", Extended Finite Element Method (XFEM 2009), 28-30 September 2009, Aachen, Germany, CD-ROM, 2009

CHAHINE E., LABORDE P.[1], RENARD Y.[1]
"Une amélioration dans XFEM du raccord entre enrichissement et éléments finis classiques", 9`eme colloque national en calcul des structures, 25-29 September 2009, Giens, France, CD-ROM, 2009
[1] Aachen University of Technology, DE

CHENU A., MIKITYUK K., CHAWLA R.
"Modelling of Sodium Two-Phase Flow with the TRACE Code", Paper 75131, 17th Int. Conf. on Nucl. Eng. (ICONE-17), 12-16 July 2009, Brussels, Belgium, CD-ROM, 2009 (ISBN 978-0-7918-3852-5)

CHENU A., MIKITYUK K., CHAWLA R.
"One- and Two-Dimensional Simulations of Sodium Boiling under Loss-of-Flow Conditions in a Pin Bundle with the TRACE Code", Paper N13P1108, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009

CLEMENT B.[1], BIRCHLEY J., LÖFFLER H.[2], TROMM W.[3], AMRI A.[4]
"Summary and Outcome of OECD Workshop on In-Vessel Melt Pool Retention", OECD/NEA Workshop on Implementation of Severe Accident Management Measures (ISAMM 2009), Böttstein, Switzerland, 26-28 October 2009, CD-ROM, 2009
[1] IRSN, Cadarache, FR
[2] GRS, Cologne, DE
[3] FZK, Karlsruhe, DE
[4] OECD/NEA, Paris, FR

COTTIS R.A.[1], BOSCH R.W.[2], CSECS K.[3], DORSCH T.[4], DUNBAR L.[5], HORNER T.[5], HEYN A.[6], HUET F.[7], HYOKYVIRTA O.[8], KERNER Z.[9], LEGAT A.[10], MACAK J.[11], MOLANDER A.[12], NOVOTNY R.[13], ÖIJERHOLM J.[14], RITTER S., SANCHEZ-AMAYA J.M.[15]
"Reliability of Electrochemical Noise Measurements – Part 1: Results of Round-Robin Testing on Electrochemical Noise", 2009 Eur. Corrosion Congr. (EUROCORR 2009), 6-10 September 2009, Nice, France, CD-ROM, 2009
[1] University of Manchester, UK
[2] SCK-CEN, Brussels, BE
[3] AREVA NP, Paris, FR
[4] AREVA NP GmbH, Erlangen, DE
[5] SERCO, Dorchester, UK
[6] University of Zurich, CH
[7] UPR15-CNRS, Université Pierre et Marie Curie, Paris, FR
[8] VTT, Helsinki, FI
[9] KFKI, Budapest, HU
[10] Slovenian National Building and Civil Engineering Institute, Slovenia, SI
[11] Institute of Chemical Technology, Prague, CZ
[12] Studsvik Ecosafe, Nykoping, SE
[13] JRC, Petten, NL
[14] Studsvik Nuclear AB, Nyköping, SE
[15] University of Cadiz, ES

DEGUELDRE C., KURI G., MARTIN M., FROIDEVAL A., CAMMELLI S., BERTSCH J., ORLOV A., POUCHON M.A.
"Nuclear material investigations by advanced analytical techniques", 11th Int. Conf. on Adv. Materials (ICAM 2009), 20-25 September 2009, Rio de Janeiro, Brazil, CD-ROM, 2009

DEHBI A.
"A Stochastic Lagrangian Model for Predicting Turbulent Aerosol Deposition in an Idealized Mouth-Throat Geometry", Eur. Aerosol Conf., 6-11 September 2009, Karlsruhe, Germany, CD-ROM, 2009

DEHBI A.
"Assessment against DNS data of a coupled CFD-stochastic model for particle dispersion in turbulent channel flows", OECD/NEA-IAEA Joint Conf. on Experiments and CFD Code Applications to Nuclear Reactor Safety (XCFD4NRS), 10-12 September 2008, Grenoble, France, CD-ROM, 2009

EPINEY A., ALPY N.[1], HAUBENSACK D.[1], MALO J.[1], MIKITYUK K., CHAWLA R.
"Preliminary Design of a Brayton Cycle as a Standalone Decay Heat Removal System for the Gas-Cooled Fast Reactor", Paper N13P1091, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009
[1] CEA, Cadarache, FR

EPINEY A., MIKITYUK K., CHAWLA R.
"Gas-Cooled Fast Reactor: Studies on Safety Enhancement", Int. Youth Conf. on Energetics 2009 (3rd ENEN PhD Event 2009), 5 June 2009, Budapest, Hungary, CD-ROM, 2009 (ISBN 978-963-420-983-6)

EPINEY A., MIKITYUK K., CHAWLA R.
"Heavy-Gas Injection in the Generation IV Gas-Cooled Fast Reactor to improve Decay Heat Removal under Depressurized Conditions", Paper N13P1032, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009

ERKAN N., MIGNOT G., ZBORAY R., PALADINO D.
"Spray Tests in PANDA to Study Accident Mitigation in PWR Containments", Paper 415, Int. Conf. Nuclear Energy for New Europe 2009, 14-17 September 2009, Bled, Slovenia, CD-ROM, 2009 (ISBN 978-961-6207-30-0)

FOKKEN J., KAPULLA R., KUHN H.[1], DYCK C., PRASSER H.M.
"Comparison of PIV Measurements and Numerical Calculations in Stably-Stratified Isokinetic Turbulent Mixing Layers", 17. Fachtagung: Lasermethoden in der Strömungsmesstechnik (GALA 17), 8-10 September 2009, Erlangen, Germany, CD-ROM, 2009
[1] ETHZ, Zurich, CH

FREIXA J., MANERA A., REVENTOS F.[1]
"TRACE and RELAP5 Thermal-Hydraulic Analysis on Boron Dilution Tests at the PKL Facility", Paper N13P1204, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September – 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009
[1] Technical University of Catalonia, Barcelona, ES

GIRARDIN G., BLANCHET D.[1], MIKITYUK K., RIMPAULT G.[1], CHAWLA R.
"Three-Dmensional Core Behaviour Analysis of the Gas-Cooled Fast Reactor (GFR) during Hypothetical Control Assembly Withdrawal Accidents", Paper 75539, 17th Int. Conf. on Nucl. Eng. (ICONE-17), 12-16 July 2009, Brussels, Belgium, CD-ROM, 2009 (ISBN 978-0-7918-3852-5)
[1] CEA, Cadarache, FR

GUENTAY S., BRUCHERTSEIFER H., VENZ H.[1], WALLIMANN F.[1], JAECKEL B.S.
"A Novel Process for Efficient Retention of Volatile Iodine Species in Aqueous Solutions during Reactor Accidents", OECD/NEA Workshop on Implementation of Severe Accident Management Measures (ISAMM 2009), Böttstein, Switzerland, 26-28 October 2009, CD-ROM, 2009
[1] Axpo AG, KKB Beznau, CH

HERRANZ L.[1], VALLEJO I.[1], KHVOSTOV G., SERCOMBE J.[2], ZHOU G.[3]
"Insights into Fuel Rod Performance Codes during RAMPS: Results of a Code Benchmark based on the SCIP Project", Paper 2188, 2009 Water Reactor Fuel Performance Meeting (TOPFUEL 2009), 6-10 September 2009, Paris, France, CD-ROM, 2009
[1] CIEMAT, Madrid, ES
[2] CEA, Paul-lez-Durance, FR
[3] Westinghouse Electric Sweden AB, Västeras, SE

HOFFELNER W.
"Creep-fatigue life determination of grade-91 steel using a strain-range separation method", 2009 ASME Pressure Vessel and Piping Conf. (PVP), 26-30 July 2009, Prague, Czech Republic, CD-ROM, 2009 (ISBN 978-0-7918-3854-9)

HOFFELNER W.
"Materials databases and knowledge management for advanced nuclear technologies", 2009 ASME Pressure Vessel and Piping Conf. (PVP), 26-30 July 2009, Prague, Czech Republic, CD-ROM, 2009 (ISBN 978-0-7918-3854-9)

HOFFELNER W., CHEN J.C.
"Creep problems in advanced nuclear plants: creep and fracture in high temperature components", 2nd ECCC Creep Conf., 21-23 April 2009, Zurich, Switzerland, Vol. 1, 161-167, 2009 (ISBN 978-1-60595-005-1)

JAECKEL B.S.
"Analysis of B_4C QUENCH Experiments using MELCOR", 15th Int. QUENCH Workshop, 3-5 November 2009, Karlsruhe, Germany, CD-ROM, 2009 (ISBN: 978-3-923704-71-2)

JORDAN K.A., PERRET G., MURPHY M.
"Power-Ratio Measurements with Burnt Fuel Samples using Delayed Neutrons", Paper 204313, 2009 American Nuclear Society (ANS) Annual Meeting, 14-18 June 2009, Atlanta, USA, CD-ROM, 2009

KAPULLA R., DYCK C., FOKKEN J.
"Optical Flux and Cross-Correlation Techniques for Velocity Field Calculations", 17. Fachtagung: Lasermethoden in der Strömungsmesstechnik (GALA 17), 8-10 September 2009, Erlangen, Germany, CD-ROM, 2009

KAPULLA R., MIGNOT G., PALADINO D., ZBORAY R., GUPTA S.
"Break-Up of Gas Stratification in LWR Containment Induced by Negatively Buoyant Jets and Plumes", Paper 75708, 17th Int. Conf. on Nucl. Eng. (ICONE-17), 12-16 July 2009, Brussels, Belgium, CD-ROM, 2009

KHVOSTOV G.
"A Dynamic Model for Fission Gas Release and Gaseous Swelling Integrated into the Falcon Fuel Analysis and Licensing Code", Paper 2085, 2009 Water Reactor Fuel Performance Meeting (TOP FUEL 2009), 6-10 September 2009, Paris, France, CD-ROM, 2009

KHVOSTOV G., ZIMMERMANN M.A., LEDERGERBER G.[1]
"Parametric Study of Fuel Rod Behaviour during the RIA using the Modified FALCON Code", OECD/NEA Workshop on Nuclear Fuel Behaviour during Reactivity Initiated Accidents, 9-11 September 2009, Paris, France, CD-ROM, 2009
[1] KKL, Leibstadt, CH

KIM T.W., MANERA A., ZIMMERMANN M.A., DANG V.N.
"Effect of Power Uprate on Exceedance Frequency during MBLOCA with Minimum Specifications for Success", Paper N13P1149, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009

KOLBE E., VASILIEV A., FERROUKHI H.
"Assessment of S(α,β) Libraries for Criticality Safety Evaluations of Wet Storage Pools by Refined Trend Analyses", 2009 Nuclear Criticality Safety Division Topical Meeting (NCSD 2009), 13-17 September 2009, Richland, USA, CD-ROM, 2009 (ISBN 978-0-89448-71-3)

KREPEL J., MIKITYUK K., SUN K., RIMPAULT G.[1]
"SFR equilibrium cycle analysis with the EQL3D procedure", Paper 9226, 2009 Int. Congr. on Advances in Nuclear Power Plants (ICAPP'09), 10-14 May 2009, Tokyo, Japan, CD-ROM, 2009
[1] CEA, Cadarache, FR

KREPEL J., SAROTTO M.[1], MIKITYUK K., ARTIOLI C.[1]
"EFIT fuel-cycle analysis with the EQL3D procedure", Paper 9227, 2009 Int. Congr. on Advances in Nuclear Power Plants (ICAPP'09), 10-14 May 2009, Tokyo, Japan, CD-ROM, 2009
[1] ENEA, Rome, IT

KRÖHNERT H., MURPHY M., PERRET G., CHAWLA R.
"Utilization of Freshly-Induced High-Energy Gamma-Ray Activity as a Measure of Fission Rates in Re-Irradiated Burnt UO_2 Fuel", Paper 122, Advancements in Nuclear Instrumentation, Measurement Methods and their Applications (ANIMMA 2009), 7-10 June 2009, Marseille, France, CD-ROM, 2009

KUHN S., BRAILLARD O.[1], NICENO B., PRASSER H.M.
"Large-Eddy Simulation of Conjugate Heat Transfer in T-Junctions", Paper N13P1099 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydrolics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009
[1] CEA, Cadarache, FR

KUHN S., NICENO B., PRASSER H.M.
"Computational Study of Conjugate Heat Transfer in T-Junctions", Paper 88451, ASME Summer Heat Transfer Conference, 19-23 July 2009, San Francisco, USA, CD-ROM, 2009 (ISBN 978-0-7918-3851-8)

KUHN S., NICENO B., PRASSER H.M.
"Thermal Design of the IFMIF Specimen using CFD Simulation", Paper N13P1072, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydrolics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009

KURI G., DEGUELDRE C., BERTSCH J., DOEBELI M.
"Structural investigations in helium-implanted cubic zirconia using grazing-incidence XRD and EXAFS spectroscopy", Int. Conf. on Ion Beam Analysis, 7-11 September 2009, Cambridge, United Kingdom, CD-ROM, 2009

LEYER S.[1], MAISBERGER F.[1], SCHAUB B.[1], BRETTSCHUH W.[1], DOLL M.[1], WICH M.[1], SCHÄFER H.[1], MANERA A., PRASSER H.M.
"Full-scale quasi-steady-state component tests of the SWR 1000 emergency condenser at the INKA test facility", Paper 9158, 2009 Int. Congr. on Advances in Nuclear Power Plants (ICAPP'09), 10-14 May 2009, Tokyo, Japan, CD-ROM, 2009
[1] AREVA NP GmbH, Offenbach, DE

LIAO Y., GUENTAY S.
"Non-Condensable Gas Effect on Film Condensation of Boundary Layer Flow in the Entire Mixed Convection Regime", Paper N13P1036, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa, Japan, CD-ROM, 2009

LIAO Y., GUENTAY S.
"Time Window for Steam Generator Secondary Side Reflooding to Mitigate Large Early Release Following SBO-Induced SGTR Accidents", OECD/NEA Workshop on Implementation of Severe Accident Management Measures (ISAMM 2009), Böttstein, Switzerland, 26-28 October 2009, CD-ROM, 2009

LIAO Y., GUENTAY S., SUCKOW D.
"The Once-Through Mode of Steam Generator Steam Reflux Condensation in Loss-of-Coolant-Accident Scenarios", Paper N13P1375, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009

LIND T., PINTER A.[1], NAQY I.[1], STUCKERT J.[2]
"Aerosol Release from Silver Indium Cadmium Control Rod", Eur. Aerosol Conf., 6-11 September 2009, Karlsruhe, Germany, CD-ROM, 2009
[1] KFKI, Budapest, HU
[2] FZK, Karlsruhe, DE

LOTHENBACH B.[1], WIELAND E., FIGI R.[1], RENTSCH D.[1], SCHWYN B.[2]
"Hydration of blended cements", 17. Int. Baustofftagung (ibausil), 23-25 September 2009, Weimar, Germany, Vol. 1, 213-218, 2009
[1] EMPA, Dübendorf, CH
[2] NAGRA, Wettingen, CH

MANERA A., PRASSER H.M., LECHNER R.[1], FRANK T.[1]
"Towards the Prediction of Temperature Fluctuations by means of Steady RANS for the Estimation of Thermal Fatigue", Paper N13P1312, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009 (ISBN)
[1] ANSYS, Otterfing, DE

MIGNOT G., KAPULLA R., ZBORAY R., ERKAN N., PALADINO D.
"Parametric Study of Containment Gas Stratification Break-Up by Vertical Fluid Release", Paper N13P1087, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009

MIKITYUK K.
"FAST Code System: Review of Recent Developments and Near-Future Plans", Paper 75152, 17th Int. Conf. on Nucl. Eng. (ICONE-17), 12-16 July 2009, Brussels, Belgium, CD-ROM, 2009 (ISBN 978-0-7918-3852-5)

MIKITYUK K.
"Review of the recent FAST project activities related to Gen-IV fast reactors", Int. Conf. on Fast Reactors and Related Fuel Cycles (FR09), 7-11 December 2009, Kyoto, Japan, CD-ROM, 2009

MILJEVIC B.[1], MEYER N., BURTSCHER H.[2], KELLER A.[3], RICHARD A., GOOD J.[4], DOBERER A.[4], LAUBER A.[4], NUSSBAUMER T.[4], HERINGA M., PREVOT A., DECARLO P., BALTENSPERGER U., FAIRFULL-SMITH K.[1], RISTOVSKI Z.[5], BOTTLE S.[1]
"Oxidative potential of logwood and pellet burning particles assessed by a novel profluorescent nitroxide probe", Eur. Aerosol Conf., 6-11 September 2009, Karlsruhe, Germany, CD-ROM, 2009
[1] Queensland University of Technology, Brisbane, AU
[2] FHNW, Windisch, CH
[3] University of Applied Sciences, Windisch, CH
[4] Lucerne University of Applied Sciences and Arts, Horw, CH
[5] Aachen University of Technology, DE

NICENO B., BADILLO A., SMITH B.L.
"A Three-Dimensional, Immersed-Boundary, Finite-Volume Method for Simulation of Single- and Multi-Phase Flows", Academy Colloquium on Immersed Boundary Methods, Current Status and Future Research, 15-17 June 2009, Amsterdam, Netherlands, CD-ROM, 2009

NICENO B., ZBORAY R., PRASSER H.M.
"Experimental and Numerical Mixing Studies Relevant for Prediction of Thermal Loads in T-Junctions", 6th Int. Symp. on Turbulence, Heat and Mass Transfer (THMT09), Rome, Italy, September 14-18, 2009 Rome, Italy, CD-ROM, 2009

NIFFENEGGER M., JANSSEN S., REICHLIN K.
"Experimental and Numerical Investigation of Cyclic Thermal Shock at the Paul Scherrer Institute", 20th Int. Conf. on Structural Mechanics in Reactor Technology (SMiRT 20), 9-14 August 2009, Espoo, Finland, CD-ROM, 2009

NIKITIN K., MANERA A.
"Simulation of Reflood Experiments using the Best-Estimate Thermal-Hydraulics Code TRACE", Paper N13P1354, 13th Int.Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009

PALADINO D., AUBAN O., HUGGENBERGER M., DREIER J.
"A PANDA Integral Test of the Effect of Light Gas on a Passive Containment Cooling System (PCCS)", Paper N13P1418, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009

PELLONI S., MIKITYUK K., EPINEY A.
"A new cross-section generation model in the FAST code system and its application to the Gen-IV Gas-cooled FAST Reactor", Int. Conf. on Mathematics, Computational Methods & Reactor Physics (M&C 2009), 3-7 May 2009, Saratoga Springs, NY, USA, CD-ROM, 2009 (ISBN 978-0-89448-069-0)

POETTE C.[1], BRUN-MAGAUD V.[1], MORIN F.[1], PIGNATEL J.F.[1], STAINSBY R.[2], MIKITYUK K.
"ALLEGRO: The European Gas Fast Reactor Demonstrator Project", Paper 75326, 17th Int. Conf. on Nucl. Eng. (ICONE-17), 12-16 July 2009, Brussels, Belgium, CD-ROM, 2009 (ISBN 978-0-7918-3852-5)
[1] CEA, Cadarache, FR
[2] AMEC NCC Ltd., Knutsford, UK

POETTE C.[1], MALO J.[1], BRUN-MAGAUD V.[1], MORIN F.[1], DOR I.[1], MATHIEU B.[1], DUHAMEL H.[2], STAINSBY R.[3], MIKITYUK K.
"GFR Demonstrator ALLEGRO Design Status", Paper 9062, 2009 Int. Congr. on Advances in Nuclear Power Plants (ICAPP'09), 10-14 May 2009, Tokyo, Japan, CD-ROM, 2009
[1] CEA, Cadarache, FR
[2] COMEX-NUCLEAIRE, Marseille, FR
[3] AMEC NCC Ltd., Knutsford, UK

POPOV D., DÄHN R., GROLIMUND D., PATTISON P.[1], WIELAND E.
"Application of X-ray micro-diffraction techniques for characterizing cement materials", 17. Int. Baustofftagung (ibausil), 23-25 September 2009, Weimar, Germany, Vol. 2, 135-140, 2009
[1] EPFL, Lausanne, CH

PRASSER H.-M., DAMSOHN M.[1], FOKKEN J., FREY S.[1]
“Novel fluid-dynamic instrumentation for mixing studies developed at ETH Zurich and PSI”, Paper N13P1411, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009
[1] ETHZ, Zurich, CH

PRASSER H.-M., MANERA A., NICENO B., SIMIANO M., SMITH B.L., WALKER C.[1], ZBORAY R.
“Fluid Mixing at a T-Junction”, OECD/NEA-IAEA Joint Conf. on Experiments and CFD Code Applications to Nuclear Reactor Safety (XCFD4NRS), 10-12 September 2008, Grenoble, France, CD-ROM, 2009
[1] JRC/ITU, Karlsruhe, DE

PROFF C., ABOLHASSANI S.
“TEM Analysis of the microstructure of precipitates in binary zirconium alloys after in situ oxidation”, Paper M6.P400, Microscopy Conf. 2009 (MC 2009 Graz), 30 August – 4 September 2009, Vol. 3, 477-478, 2009

PURAGLIESI R.[1], LERICHE E.[2], SOLDATI A.[3], GUENTAY S., DEHBI A., DEVILLE M.[1]
“Direct Numerical Simulation of Buoyancy-Driven Turbulence inside a Cubic Cavity”, 2nd Int. Conf. on Turbulence and Interaction, 31 May - 5 June 2009, Sainte-Luce, Martinique, France, CD-ROM, 2009
[1] EPFL, Lausanne, CH
[2] Université Jean Monnet, Saint-Etienne, FR
[3] University of Udine, IT

RESTANI R., PORTIER S., WÄLCHLI A.
“Shielded Electron Probe Microanalysers (EPMA) from Cameca to Jeol: Preliminary Comparison of Design and Physical Properties”, 46th Annual Meeting Hot Laboratories and Remote Handling, 20-23 September 2009, Prague, Czech Republic, CD-ROM, 2009

RICHNER M.[1], ZIMMERMANN S.[1], BIRCHLEY J., HASTE T.[2], DESSARS N.[3]
“Accident Management and Risk Evaluation of Shutdown Modes at Beznau NPP”, OECD/NEA Workshop on Implementation of Severe Accident Management Measures (ISAMM 2009), Böttstein, Switzerland, 26-28 October 2009, CD-ROM, 2009
[1] NOK AG, Baden, CH
[2] IRSN, Cadarache, FR
[3] Westinghouse Electric Belgium SA, Nivelles, BE

RITTER S., HUET F.[1], COTTIS R.A.[2]
“Reliability of Electrochemical Noise Measurements – Part 2: First ECG-COMON Guideline for an Assessment of Electrochemical Noise Measurement Devices”, 2009 Eur. Corrosion Congr. (EUROCORR 2009), 6-10 September 2009, Nice, France, CD-ROM, 2009
[1] University Pierre et Marie Curie, France, FR
[2] University of Manchester, UK

RITTER S., SEIFERT H.P.
“Effect of RE Distance on the Potential Noise in High-Purity, High-Temperature Water”, Ann. Meeting Eur. Cooperative Group on Corrosion Monitoring of Nuclear Materials, 15-16 June 2009, Cadiz, Spain, CD-ROM, 2009

RITTER S., SEIFERT H.P.
“The Influence of Chloride Impurities on the SCC Crack Growth Behavior of Low-Alloy Reactor Pressure Vessel Steels under Simulated BWR Conditions”, 12th Int. Conf. on Fracture, 12-17 July 2009, Ottawa, Canada, CD-ROM, 2009

RITTERATH M.[1], PRASSER H.-M., PALADINO D.
“New PANDA instrumentation for assessing gas concentration distributions in containment compartments”, OECD/NEA-IAEA Joint Conf. on Experiments and CFD Code Applications to Nuclear Reactor Safety (XCFD4NRS), 10-12 September 2008, Grenoble, France, CD-ROM, 2009
[1] ETHZ, Zurich, CH

RITTERATH M.[1], PRASSER H.-M., PALADINO D., MIGNOT G.
“New Gas Concentration Measurement System for the PANDA Containment Test Facility”, Paper N13P1410, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009
[1] ETHZ, Zurich, CH

RITTERATH M.[1], VOSER P., PRASSER H.-M., PALADINO D.
“Robust Thermal Flow Sensors for a Containment Test Facility”, Paper 5924, IEEE Sensors 2009 Conf., Christchurch, New Zealand, 25-28 October, 2009
[1] ETHZ, Zurich, CH

SEIFERT H.P., RITTER S.
“Corrosion Fatigue of Wrought Low-Carbon and Stabilized Austenitic Stainless Steels under LWR Conditions”, Ann. Meeting Int. Cooperative Group on Environmentally Assisted Cracking of Water Reactor Materials, 19-24 April 2009, Boston, USA, CD-ROM, 2009

SEIFERT H.P., RITTER S., LEBER H.
“Corrosion Fatigue Behaviour of Austenitic Stainless Steels under Simulated BWR/HWC and PWR Conditions”, 14th Int. Conf. on Environmental Degradation of Materials in Nuclear Systems — Water Reactors, 23-27 August 2009, Virginia Beach, USA, CD-ROM, 2009

SEPOLD L.[1], LIND T., PINTER A.[2], STEINBRÜCK J.[1], STUCKERT J.[1]
“Results of the QUENCH-13 Reflood Bundle Test with Incorporation of an AgInCd Absorber Rod”, Paper 9034, 2009 Int. Congr. on Advances in Nuclear Power Plants (ICAPP’09), 10-14 May, 2009, Tokyo, Japan, CD-ROM, 2009
[1] FZK, Karlsruhe, DE
[2] KFKI, Budapest, HU

SHARABI M., MANERA A., ANDREANI M.
“Implementation of Improved Heat Transfer Correlations in RELAP5 and Application to the HPLWR”, 4th Int. Symp. Supercritical Water Reactors, 8-11 March 2009, Heidelberg, Germany, CD-ROM, 2009

SMITH B.L.
“Identification and Priorization of Generic Nuclear Safety Problems Requiring CFD Analysis”, Paper 75482, 17th Int. Congr. on Nucl. Eng. (ICONE-17), 12-16 July 2009, Brussels, Belgium, CD-ROM, 2009

SMITH B.L.
“The Establishment of a Web Portal for the Assessment of CFD in Reactor Safety Analysis” Paper N13P1035, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009

STARFLINGER J.[1], SCHULENBERG T.[1], MARSAULT PH.[2], BITTERMANN D.[3], MARACZY C.[4], LAURIEN E.[5], LYCKLAMA À NIJEHOLT J.A.[6], ANGLART, H.[7], ANDREANI, M., RUZICKOVA, M.[8], HEIKINHEIMO, L.[9]
“Results of the Mid-Term Assessment of the High Performance Light Water Reactor Phase 2 Project”, Paper 9268, 2009 Int. Congr. on Advances in Nuclear Power Plants (ICAPP’09), 10-14 May 2009, Tokyo, Japan, CD-ROM, 2009
[1] FZK, Karlesruhe, DE
[2] CEA, Cadarache, FR
[3] AREVA NP, Erlangen, DE
[4] KFKI, Budapest, HU
[5] Universityof Stuttgart, DE
[6] NRG, Petten, NL
[7] KTH, Stockholm, SE
[8] UJV, Rez, CZ
[9] VTT, Espoo, FI

SVEDKAUSKAITE-LEGORE J., KIVEL N., GÜNTHER-LEOPOLD I.
“Real-time measurement of fission products released from spent nuclear oxide fuel by thermal treatment”, GLOBAL 2009: The Nuclear Fuel Cycle: Sustainable Options & Industrial Perspectives, 6-11 September 2009, Paris, France, CD-ROM, 2009

WIESELQUIST W.A., ANISTRATOV D.Y.
“A Quasi-Diffusion Method for Unstructured Quadrilateral Meshes in 2D XY Geometry”, Int. Conf. Computational Methods and Reactor Physics, 3-7 May, 2009, Saratoga Springs, USA, CD-ROM, 2009

ZBORAY R., PALADINO D., MIGNOT G., KAPULLA R., ERKAN N., ANDREANI M.
“Mixing of Density-Stratified Containment Atmosphere by Horizontal Jet Release”, Paper 403, Int. Conf. Nuclear Energy for New Europe 2009, 14-17 September 2009, Bled, Slovenia, CD-ROM, 2009 (ISBN 978-961-6207-30-0)

ZEVENHOVEN M.[1], LIND T., HOKKINEN J.[2], JOKINIEMI J.[3], MOILANEN P.[2]
“Fine-particle formation from combustion of industrial and municipal waste in FBC – a focus on fuel quality, ash forming matter and trace metals.”, Twin World Congress, 14-16 September 2009, Davos, Switzerland, CD-ROM, 2009
[1] A.P. Vinogradov Inst. Of Geochem., Irkutsk, RU
[2] VTT, Helsinki, FI
[3] VTT Energy, Espoo, FI

ZIMMERMANN M.A., KIM T.W., LAROCHE S.[1], UI A.[2], EBATA S.[2], JEONG J.J.[3], AHN S.H.[4], GAVRILAS M.[5], HORTAL J.[6]
"Towards quantification of plant safety margins: a status report", Paper N13P1396, 13th Int. Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13), 27 September - 2 October 2009, Kanazawa City, Japan, CD-ROM, 2009
[1] EDF, Clamart, FR
[2] JNES, Tokyo, JP
[3] KAERI, Taejon, KR
[4] KINS, Daejeon, KR
[5] NRC, Washington, US
[6] CSN, Madrid, ES

Talks delivered at Conferences, Workshops and Specialist Meetings (without Proceedings)

AL T.[1], XIANG Y.[1], CAVE L.[1], LOOMER D.[1], VILKS P.[2], VAN LOON L.R.
"Diffusion measurements in low-permeability Ordovician sedimentary rocks from southern Ontario", Joint Assembly of the American Geophysical Union (AGU2009), Toronto, Canada, 24-27 May 2009
[1] University of New Brunswick, CA
[2] AECL, Ottawa, CA

ALTMANN S.[1], TOURNASSAT C.[2], GOUTELARD F.[3], PARNEIX J.[1], GIMMI T.
"Radionuclide migration in clay rock host formations for deep geological disposal of radioactive waste: advances in process understanding and up-scaling methods resulting from the EC integrated project FUNMIG", General Assembly of the European Geosciences Union, Vienna, Austria, 19-24 April 2009
[1] Andra, Chatenay-Malabry, FR
[2] BRGM, Orleans, FR
[3] CEA, Saclay, FR

AMAYRI S.[1], FRÖHLICH D.[1], WU T.[1], DREBERT J.[1], VAN LOON L.R., REICH T.[1]
"Untersuchung der Sorption und Diffusion von Neptunium(V) in Opalinuston", Wissenschaftsforum Chemie GDCh2009, Frankfurt am Main, Germany, 30 August – 2 September 2009
[1] Johannes Gutenberg University, Mainz, DE

AMAYRI S.[1], FRÖHLICH D.[1], WU T.[1], DREBERT J.[1], VAN LOON L.R., REICH T.[1]
"Sorption and diffusion behavior of neptunium(V) in Opalinus Clay", 12th Int. Conf. Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere (Migration 09), Kennewick, USA, 20-25 September 2009
[1] Johannes Gutenberg University, Mainz, DE

APPELO C.[1], WERSIN P.[2], VAN LOON L.R., DEWONCK S.[3]
"Modeling cesium diffusion in a claystone formation", Goldschmidt 09 Conf., Davos, Switzerland, 21-26 June 2009
[1] Hydrochemical Consultant, Amsterdam, NL
[2] Gruner AG, Basel, CH
[3] ANDRA, Bure, FR

BEAUDOIN A.[1], JANSSENS K., ACHARYA A.[2]
"Application of Field Dislocation Mechanics to Cyclic Plasticity", Symposium on Fatigue: Mechanisms, Theory, Experiments and Industry Practice, TMS Annual Meeting, San Francisco, USA, 15-19 February 2009
[1] University of Illinois, Urbana-Champaign, US
[2] Mississippi State University, US

BIRCHLEY J., HASTE T.[1]
"Modeling of zircaloy oxidation in air", Int. Workshop on Computational and Experimental Studies of LWR Fuel Element Behavior under Beyond Design Basis Accidents and Reflood, IBRAE, Moscow, Russian Federation, 27-28 July 2009
[1] IRSN, Cadarache, FR

BREIMESSER M.
"EN and Micro-Capillary Measurements at Room Temperature – an Update", 5th Ann. Meeting of the European Cooperative Group on Corrosion Monitoring of Nuclear Materials(ECG-COMON), Cadiz, Spain, 15-16 June 2009, 2009

BREIMESSER M., RITTER S., SEIFERT H.P., SUTER T.[1], VIRTANEN S.[2]
"Electrochemical Noise of SCC in Stainless Steels: a Combined Macro- and Micro-Electrochemical Approach", Kurt Schwabe Corrosion Symp., Erlangen, Germany, 24-28 May 2009
[1] EMPA, Dübendorf, CH
[2] University Erlangen-Nürnberg, Nürnberg, DE

CAVEDON J.M.
"International Research in Generation IV Systems, 56th NEA/NDC Committee Meeting, Paris, France, 25 June 2009

CAVEDON J.M.
"Ten years of achievements and the path forward", Generation IV International Forum (GIF) Symposium, Paris, France, 9-10 September 2009

CHAHINE E.
"Une amélioration dans XFEM du raccord entre enrichissement et éléments finis classiques", 9`eme colloque national en calcul des structures, Université de Paris 1, Giens, France, 25-29 May 2009

CHAHINE E.
"Theoretical and numerical analysis of the integral matching XFEM: an optimal XFEM approach for removing blending elements", 10th US National Congr. on Computational Mechanics, Columbus, Ohio, USA, 1-4 July 2009

CHURAKOV S.
"Ab initio molecular dynamics simulations of clay minerals", 14th Int. Clay Conf., Castellaneta Marina, Italy, 14-20 June 2009

CHURAKOV S., GIMMI T.
"Up-scaling of molecular diffusion coefficients in clays: a two-scale approach", Invited Talk, Workshop on Modelling of Coupled Reactive Transport Processes (TRePro II), Karlsruhe, Germany, 18-19 March 2009

DÄHN R., MACÉ N., POPOV D., SHUH D.[1], WIELAND E.
"Determination of the speciation of radionuclides in cementitious materials by micro-XRF/XAS/XRD and STXM. XAFS XIV", 14th Int. Conf. on X-ray absorption fine structure, Camerino, Italy, 26-31 July 2009
[1] EPFL, Lausanne, CH

DIAZ N., JAKOB A., VAN LOON L.R., GROLIMUND D.
"Modeling contaminant diffusion in highly complex rock structures", 3rd Eur. COMSOL Conf., Milan, Italy, 14-16 October 2009

DILNESA B.[1], WIELAND E., LOTHENBACH B.[1], DÄHN R., SCRIVENER K.[2]
"X-ray absorption spectroscopy investigation of iron phases", Fred Glasser Cement Science Symp., Aberdeen, United Kingdom, 17-18 June 2009
[1] EMPA, Dübendorf, CH
[2] EPFL, Lausanne, CH

FREIXA J., MANERA A.
"TRACE and RELAP5 Thermal Hydraulic Analysis on Boron Dilution Tests at the PKL Facility", CAMP Spring Meeting 2009, TUM, Munich, Germany, 17-19 June 2009

FROIDEVAL A., IGLESIAS R., POUCHON M.A., SAMARAS M., CHEN J.C., SCHUPPLER S.[1], NAGEL P.[1], HOFFELNER W.
"Does material composition affect the magnetism of Fe-Cr alloys", 1st ANKA/KNMF Joint Users' Meeting 2009, EIfER, Karlsruhe, Germany, 8-9 October 2009
[1] FZK, Karlsruhe, DE

GAO N., DERLET P., SAMARAS M., VAN SWYGENHOVEN H.
"A molecular dynamics investigation of He clustering kinetics in BCC Fe in presence of grain boundaries", Eur. Congr. and Exhibition on Advanced Materials and Processing (Euromat 2009), Glasgow, United Kingdom, 7-10 September 2009

GAONA X., KULIK D., TITS J., MACÉ N., WIELAND E.
"Aqueous-solid solution model of U(VI) uptake in C-S-H phases", Actinides Conf. 2009, San Francisco, USA, 12-17 July 2009

GAONA X., TITS J., WIELAND E.
"Uptake of Np by cementitious materials: redox behavior of Np(IV/V) under hyperalkaline conditions", Actinides Conf. 2009, San Francisco, USA, 12-17 July 2009

GAVILLET D.
"Quantification of the surface porosity in high burn-up fuel using image analysis tools", 45th Ann. Meeting: Hot Laboratories and Remote Handling, 22-23 September 2008, Kendal, United Kingdom, 1-11, 2009

GIMMI T., CHURAKOV S.
"Hierarchical modelling of solute diffusion in clays: from the molecular to the continuum scale", General Assembly European Geosciences Union, Vienna, Austria, 19-24 April 2009

GIMMI T., LEUPIN O.[1], VAN LOON L.R., WERSIN P.[2], BAEYENS B., EIKENBERG J., SOLER J.[3], SAMPER J.[4], RÜBEL A.[5], DEWONCK S.[6], SAVOYE S.[7], YI S.[4], NAVES A.[4]
"A field-scale solute diffusion and retention experiment in Opalinus Clay: processes, parameters, sensitivities", General Assembly European Geosciences Union, Vienna, Austria, 19-24 April 2009
[1] NAGRA, Wettingen, CH
[2] Gruner AG, Basel, CH
[3] CSIC-IJA, Barcelona, ES
[4] University of La Coruna, ES
[5] GRS, Braunschweig, DE
[6] ANDRA, Bure, FR
[7] IRSN, Fontenay-aux-Roses, FR

GONZALEZ F., GIMMI T., JURANJI F.[1], VAN LOON L.R., KOSAKOWSKI G., UNRUH T.[2]
"Diffusion of water in compacted clays at different time scales", 9th Int. Conf. on Quasielastic Neutron Scattering, (QENS 2009), Villigen PSI, Switzerland, 10-13 February 2009
[1] University of Saarbrücken, DE
[2] FRM-II, Garching, DE

GONZALEZ F., GIMMI T., JURANJI F.[1], VAN LOON L.R., UNRUH T.[2], DIAMOND L.[3]
"Comparison of water diffusion in clays at microscopic and macroscopic scales", 9th Int. Conf. on Quasielastic Neutron Scattering (QENS 2009), Villigen PSI, Switzerland, 10-13 February 2009
[1] University of Saarbrücken, DE
[2] FRM-II, Garching, DE
[3] University of Berne, CH

GROLIMUND D., GÜNTHER D.[1], BORCA C., VAN LOON L.R., STAMPANONI M., MARONE F., BARMETTLER K.[1], AESCHLIMANN B.[1], WERSIN P.[2], HEALD S.[3]
"Contaminant transport in complex heterogeneous geological media: new insights through micro-imaging and micro-spectroscopy", Goldschmidt 09 Conf., Davos, Switzerland, 21-26 June 2009
[1] ETHZ, Zürich, CH
[2] NAGRA, Wettingen, CH
[3] PNNL, Richland, US

GROLIMUND D., GÜNTHER D.[1], BORCA C., WANG H., VAN LOON L.R., STAMPANONI M., MARONE F., MOKSO R., DIAZ N., JAKOB A., BARMETTLER K.[1], AESCHLIMANN B.[1], WERSIN P.[2], HEALD S.[3]
"Evolution of reactive transport plumes – decipher physico-chemical micro-complexity using micro-spectroscopy, chemical micro-imaging, and micro-tomography", 20th Int. Congr. X-ray Optics and Microanalysis, (IXCOM20), Karlsruhe, Germany, 14-18 September 2009
[1] ETHZ, Zurich, CH
[2] NAGRA, Wettingen, CH
[3] PNNL, Richland, US

GUENTAY S., BRUCHERTSEIFER H., VENZ H.[1], WALLIMANN F.[1]
"Rückhaltung Aller Iodspezies im Containment bei einem Schweren Störfall, ein Neues Technisches Verfahren", Jahres. Kern., 12-14 May 2009, Dresden, Germany, CD-ROM, 2009
[1] Axpo AG, KKB Beznau, CH

HINGERL F., KOSAKOWSKI G., KULIK D., DMYTRIEVA S.[1], DRIESNER T.[2], THOMSEN K.
"Modelling fluid-rock interaction and scale formation during geothermal heat extraction", Workshop on Modelling of Coupled Transport Reaction Processes (TRePro II), Karlsruhe, Germany, 18-19 March 2009
[1] SSE Technocentre, Kyiv, UA
[2] ETHZ, Zurich, CH

ISPANOVITY P.
"Velocity distribution of dislocations", Eur. Congr. and Exhibition on Advanced Materials and Processing (Euromat 2009), Glasgow, United Kingdom, 7-10 September 2009

ISPANOVITY P.
"Modeling submicron plasticity: yield stress and dislocation velocity distributions", Electron Microscopy and Multiscale Modelling (EMMM 09), ETHZ, Zurich, Switzerland, 27-30 October 2009

JAECKEL, B., BIRCHLEY, J.
"Experience and assessment of MELCOR 1.8.6 and 2.1 at PSI", Cooperative Severe Accident Research Program (CSARP) and MELCOR Code Assessment Program (MCAP), Technical Review Meetings, Bethesda, USA, 15-18 September, 2009

KELLER A.[1], MEYER N., LAUBER A.[1], SATTLER M.[2], GAEGAUF C.[2], DOBERERE A.[1], GOOD J.[1], NUSSBAUMER T.[1], HERINGA M., DECARLO P., RICHARD A., CHIRICO R., PREVOT A., BALTENSPERGER U., BURTSCHER H.[3]
"Quantifying wood combustion emissions with on-line methods", 14th ETH Combustion Nanoparticle Conf., ETHZ, Zurich, Switzerland, 22-24 June 2009
[1] Aachen University of Technology, DE
[2] Oekozentrum Langenbruck, CH
[3] FHNW, Windisch, CH

KITAMURA A., CURTI E., AIMOZ L.
"Reductive sorption of Se(IV,VI) onto pyrite: a μ-XRF/XAS study", Goldschmidt 09 Conference, Davos, Switzerland, 21-26 June 2009

KOSAKOWSKI G., KULIK D., SHAO H.[1], DMYTRIEVA S.[2], KOLDITZ O.[1]
"Numerical modeling of the evolution for a generic clay/cement interface", General Assembly: European Geosciences Union, Vienna, Austria, 19-24 April 2009
[1] University of Tübingen, DE
[2] SSE Technocentre, Kyiv, UA

KRACK M., CARAVATI S.[1,2], KÜHNE T.[2], PARRINELLO M.[2], BERNASCONI M.[1]
"Extending the Time and Length Scale of Ab Initio Molecular Dynamics Simulations", HPC Infrastructures for Petascale Applications (DEISA PRACE) Symp. 2009, EC, Amsterdam, Netherlands, 11-13 May 2009
1 University of Milano-Bicocca, Millano, IT
2 ETHZ, Zurich, CH

KRACK M., SAMARAS M.
"HPC needs and recent advances in ceramic materials for fission", 7th Eur. Commission Conf. on Euratom Research and Training in Reactor Systems (FISA 2009), Post FISA Workshop #4: Potential Benefits of High Performance Computing for Euratom Research, Prague, Czech Republic, 25 June 2009

KULIK D.
"From atomistic calculations to thermodynamic modelling", Joint DMG, DGK and Helmholtz Virtual Institute Workshop on Advanced Solid-Aqueous Radiogeochemistry, University of Frankfurt, Germany, 23-27 February 2009

KULIK D., VINOGRAD V.[1], PAULSEN N.[1], WINKLER B.[1]
"$(Ca,Sr)CO_3$ aqueous-solid solution systems: from atomistic calculations to geochemical modeling", 12th Int. Conf. Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere (Migration 09), Kennewick, USA, 20-25 September 2009
[1] University of Frankfurt, DE

KULIK D., WAGNER T.[1], CHUDNENKO K.[2], DMYTRIEVA S.[3], HINGERL F., BERNER U., KOSAKOWSKI G.
"GEMIPM2K: a standalone solver of complex chemical equilibria for application in radiogeochemical coupled modeling codes", 12th Int. Conf. Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere (Migration 09), Kennewick, USA, 20-25 September 2009
[1] ETHZ, Zurich, CH
[2] A.P. Vinogradov Inst. Of Geochem., Irkutsk, RU
[3] SSE Technocentre, Kyiv, UA

KURI G., DEGUELDRE C., BERTSCH J., GAVILLET D., DOEBELI M., NOVIKOV D.[1]
"Structural changes in helium-implanted Zr0.8Y0.2O1.9 single-crystal substrates and polycrystalline pellets", Hamburger Synchrotronstrahlungslabor (HASYLAB) at Deutsches Elektronen-Synchrotron (DESY), Hamburg, Germany, 30 August 2009
[1] DESY, Hamburg, DE

LOTHENBACH B.[1], WIELAND E.
"Chemical evolution of cementitious materials", NEA workshop on cementitious materials as safety case for geological repositories for radioactive waste: role, evolution, interpretation, Brussels, Belgium, 17-19 November 2009
[1] EMPA, Dübendorf, CH

MACE N., WIELAND E., DÄHN R., TITS J., SCHEINOST A.[1], STUMPF T.[2], WALTHER C.[2]
"Determination of the local coordination environment of U(VI) sorption species on cementitious materials under alkaline conditions", MRS'09, 33rd Int. Symp. Scientific Basis for Nuclear Waste Management, Saint Petersburg, Russian Federation, 24-29 May 2009
[1] ESRF, Grenoble, FR
[2] FZK, Karlsruhe, DE

MÄDER U.[1], GIMMI T.
"Reactive transport modelling of a long-term core infiltration experiment with claystone", Goldschmidt 09 Conference, Davos, Switzerland, 21-26 June 2009
[1] University of Berne, CH

MANERA A.
"Coupling CFX with the system code TRACE and application to single-phase mixing in a double T-junction loop", Invited Talk, CFD Network Meeting, GRS, Garching, Germany, 20-21 January 2009

MARQUES FERNANDES M., BAEYENS B., STUMPF T.[1], DÄHN R., BRADBURY M.H.
"The influence of carbonate complexation on actinides sorption on clay minerals", 12th Int. Conf. Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere (Migration 09), Kennewick USA, 20-25 September 2009
[1] FZK, Karlsruhe, DE

PALADINO D.
"Research Investigations at PSI Addressing LWR Containment and Primary System Thermal Hydraulics Issues", Invited Talk, 4th Semi-Annual Computational Nuclear Power Safety Seminar (CNPS-4), Royal Institute of Technology (KTH), Stockholm, Sweden, 4 December 2009

POPOV D., DÄHN R., GROLIMUND D., PATTISON P.[1], WIELAND E.
"Identification of crystalline phases of cements using X-ray micro-diffraction techniques", 25th Eur. Crystallographic Meeting, Istanbul, Turkey, 16-21 August 2009
[1] EPFL, Lausanne, CH

POPOV D., DÄHN R., GROLIMUND D., PATTISON P.[1], WIELAND E.
"Application of X-ray micro-diffraction techniques for characterizing cement materials", 20th Int. Congr. X-ray Optics and Microanalysis, Karlsruhe, Germany, 14-18 September 2009
[1] EPFL, Lausanne, CH

POUCHON M.A., GHISLENI R.[1], HOSEMANN P.[2]
"Micro-mechanical testing of irradiated materials", ZEISS European CrossBeam®/ORION® Workshop, Carl Zeiss, Dresden, Germany, 27-29 April 2009
[1] EMPA, Dübendorf, CH
[2] University of California, Davis, US

REICH T.[1], AMAYRI S.[1], FRÖHLICH D.[1], DREBERT J.[1], VAN LOON L.R., WU T.[1]
"Sorption and diffusion of Np(V) in Opalinus Clay", Goldschmidt 09, Davos, Switzerland, 21-26 June 2009
[1] Johannes Gutenberg University, Mainz, DE

REICH T.[1], AMAYRI S.[1], WENDT S.[1], BAEYENS B., DÄHN R., BRADBURY M.H., SCHEINOST A.[2]
"Spectroscopic study and surface complexation modelling of Np(V) sorption on montmorillonite", 12th Int. Conf. Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere (Migration 09), Kennewick, USA, 20-25 September 2009
[1] Johannes Gutenberg University, Mainz, DE
[2] ESRF, Grenoble, FR

RISTOVSKI Z.[1], SUNI T.[1], KULMALA M.[1], BOY M.[1], MEYER N., TURNIPSEED A.[1], MORAWSKA L.[1], BALTENSPERGER U., MODINI R.[2]
"Particle formation processes in Eucalyptus forests — the role of sulphates and organics", iLeaps-GEWEX Workshop, GEWEX, Melbourne, Australia, 24-28 August 2009
[1] Aachen University of Technology, DE
[2] Queensland University of Technology, Brisbain, AU

ROBINET J.[1], SARDINI P.[2], ALTMANN S.[1], VAN LOON L.R.
"A multi-scale evaluation of the effects of mineral-porosity spatial variability on solute diffusion in clayrock geological formations considered for hosting repositories for radioactive waste", 12th Int. Conf. Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere (Migration 09), Kennewick, USA, 20-25 September 2009
[1] Andra, Chatenay-Malabry, FR
[2] Hydrasa, Poitiers, FR

ROZOV K., BERNER U., KULIK D.
"Solubility measurements of hydrotalcite-like solid solutions", Goldschmidt 09, Davos, Switzerland, 21-26 June 2009

SAMARAS M.
"Atomistic Models of Helium Interactions with Grain Boundaries", 1st Int. Workshop on Measuring, Modeling and Managing Helium-DPA Effects, Villigen PSI, Switzerland, 15-17 June 2009

SAMARAS M.
"Issues in Modelling Ferritic Steels", Multiscale Modeling of Materials: Unsolved Problems and Challenges, ETHZ, Monte Verita, Switzerland, 4-9 September 2009

SENTIS M.[1], ALTORFER F.[1], HERFORT M.[1], JAKOB A., KOSAKOWSKI G., FRIEDEL S.[2]
“Benchmark calculations with COMSOL of the transport of radionuclides through clay and bentonite barriers in a geological repository”, 3rd Eur. COMSOL Conf., Milan, Italy, 14-16 October 2009
[1] ENSI, Brugg, CH
[2] COMSOL, Zürich, CH

SENTIS M.[1], ALTORFER F.[1], KOSAKOWSKI G.
“Benchmark calculations with Tough2-EOS9nT of the transport of nuclides through clay and bentonite barriers in a geological repository”, TOUGH Symp. 2009, Berkeley, USA, 14-16 September 2009
[1] ENSI, Brugg, CH

SHAO H.[1], KOSAKOWSKI G., KULIK D., KOLDITZ O.[1]
“Modelling retardation effects by barium and strontium solid solutions on radium cations in the near field of radioactive waste repository”, Workshop on Modelling of Coupled Reactive Transport Processes (TRePro II), Karlsruhe, Germany, 18-19 March 2009
[1] University of Tübingen, DE

SHAO H.[1], KOSAKOWSKI G., KULIK D., KOLDITZ O.[1]
“Modelling combined effects of solid-solution formation and cation exchange on the retardation of aqueous radium”, 7th Int. Conf. on Calibration and Reliability in Groundwater Modelling: Managing Groundwater and the Environment, Wuhan, China, 20-23 September 2009
[1] University of Tübingen, DE

SCHULENBERG T.[1], STARFLINGER J.[1], MARSAULT PH.[2], BITTERMANN D.[3], MARACZY C.[4], LAURIEN E.[5], LYCKLAMA À NIJEHOLT J.A.[6], ANGLART, H.[7], ANDREANI, M., RUZICKOVA, M.[8], HEIKINHEIMO, L.[9]
[1] FZK, Karlesruhe, DE
[2] CEA, Cadarache, FR
[3] AREVA NP, Erlangen, DE
[4] KFKI, Budapest, HU
[5] Universityof Stuttgart, DE
[6] NRG, Petten, NL
[7] KTH, Stockholm, SE
[8] UJV, Rez, CZ
[9] VTT, Espoo, FI
“European Supercritical Water-Cooled Reactor”, 7th Eur. Commission Conf. on Euratom Research and Training in Reactor Systems (FISA 2009), Prague, Czech Republic, 22-24 June 2009

TITS J., GAONA J., DÄHN R., POPOV D., WIELAND E.
“Immobilization of neptunium in cementitious repository environments”, NEA Workshop on Cementitious Materials as Safety Case for Geological Repositories for Radioactive Waste: Role, Evolution, Interpretation”, Brussels, Belgium, 17-19 November 2009

TÜRCK R.[1], MURPHY M., KRÖHNERT H., MACIAN-JUAN R.[1], JATUFF F.
“Assessment of the nuclide concentration estimates with CASMO-4E with experimental data for very high burn-up UO_2 and MOX fuels”, Paper 122, Jahres. Kern., 12-14 May 2009, Dresden, Germany, CD-ROM, 2009
[1] TUM, Garching, DE

TÜRCK R.[1], MURPHY M., KRÖHNERT H., MACIAN-JUAN R.[1], JATUFF F.
“Long-term evaluation of the isotopic sources of neutrons in high burn-up fuel with CASMO-4E”, Paper 123, Jahres. Kern., 12-14 May 2009, Dresden, Germany, CD-ROM, 2009
[1] TUM, Garching, DE

ULDRY A.C., SAMARAS M., IGLESIAS R., VICTORIA M., HOFFELNER W.
“From Fe-Cr to Ferritic Steel”, Ψ-k Workshop on Magnetism in Complex Systems, Density Function Theory (DFT) and Beyond, Vienna, Austria, 16-19 April 2009

ULDRY A.C., SAMARAS M., IGLESIAS R., VICTORIA M.[1], HOFFELNER W.
“Spin and orbital moments in the Fe-Cr alloy”, CECAM Workshop on Orbital Magnetization in Condensed Matter, EPFL, Lausanne, Switzerland, 1-3 June 2009
[1] EPFL, Lausanne, CH

ULDRY A.C., SAMARAS M., IGLESIAS R., VICTORIA M., HOFFELNER W.
“Structural and magnetic properties of ferritic alloys by first-principles calculations”, Eur. Congr. and Exhibition on Advanced Materials and Processing (Euromat 2009), Glasgow, United Kingdom, 7-10 September 2009

ULDRY A.C., SAMARAS M., IGLESIAS R., VICTORIA M., HOFFELNER W.
“Magnetism and structure in ferritic alloys”, Eur. Congr. and Exhibition on Advanced Materials and Processing (Euromat 2009), Glasgow, United Kingdom, 7-10 September 2009

ULDRY A.C., SAMARAS M., VICTORIA M.[1], HOFFELNER W.
"Impurities in BCC Iron by first-principles calculations", Eur. Congr. and Exhibition on Advanced Materials and Processing (Euromat 2009), Glasgow, United Kingdom, 7-10 September 2009
[1] EPFL, Lausanne, CH

ULDRY A.C., SAMARAS M., VICTORIA M., HOFFELNER W.
"Ab initio investigations of impurities in Fe", Electron Microscopy and Multiscale Modelling Conf., ETHZ, Zurich, Switzerland, 27-30 October 2009

VAN LOON L.R.
"A semi-empirical approach for estimating effective diffusion coefficients in sedimentary rocks for safety assesment purposes", 12th Int. Conf. Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere (Migration 09), Kennewick, USA, 20-25 September 2009

VAN LOON L.R., BAEYENS B., BRADBURY M.H.
"The sorption behaviour of caesium on Opalinus Clay – a comparison between intact and crushed material", 12th Int. Conf. Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere (Migration 09), Kennewick, USA, 20-25 September 2009

VASILIEV A., KOLBE E., FERROUKHI H.
"Status of Burnup Credit Activities in Switzerland", CSN/IAEA Int. Workshop on Advances in Applications of Burnup Credit for Spent Fuel Storage, Transportation, Reprocessing and Disposition, Cordoba, Spain, 27-30 October, 2009.

VINOGRAD V.[1], KULIK D., PINA C.[2], FERNANDEZ GONZALEZ A.[3], PRIETO M.[3], WINKLER B.[1]
"(Ba,Sr)SO4 solid solution – aqueous solution system: atomistic calculations and experimental constraints", 12th Int. Conf. Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere (Migration 09), Kennewick, USA, 20-25 September 2009
[1] Universiy of Frankfurt, DE
[2] University of Madrid, ES
[3] University of Oviedo, ES

ZIMMERMANN M.A.
"SM2A expert group: An attempt to quantify changes to plant safety margin as a consequence of significant plant modifications", 7th Eur. Commission Conf. on Euratom Research and Training in Reactor Systems (FISA 2009), Post FISA Workshop #7: Research towards convergence of nuclear safety practices in Europe, Prague, Czech Republic, 25 June 2009

Conference Posters (without Proceedings)

CANEPA S., RAVETTO P.[1], DULLA S.[1]
"The response matrix formulation of the multidimensional A_N method for source and eigenvalue problems", 21st Int. Conf. on Transport Theory (ICTT-21), 12-17 July, Turin, Italy
[1] DENER, Politecnico di Torino, Italy

GÜNTHER-LEOPOLD I., SVEDKAUSKAITE-LEGORE J., KIVEL N.
"Online ICP-MS detection of the thermal release of fission products from nuclear fuel samples", European Winter Conf. of Plasma Spectrochemistry, Graz, Austria, 15-20 February 2009

KIVEL N., PORTIER S., MARTIN M., GÜNTHER-LEOPOLD I.
"Development of an electron impact ion source for an Element 2 mass spectrometer", 8th Int. Sector Field ICP-MS Conf., University of Ghent, Belgium, 14-16 September 2009

KOBLER WALDIS J., LINDER H.P., JOHNSON L.[1], GÜNTHER-LEOPOLD I.
"Leaching experiments on spent nuclear fuel for safety assessment studies, 8th Int. Sector Field ICP-MS Conf., University of Ghent, Belgium, 14-16 September 2009
[1] NAGRA, Wettingen, CH

KREPEL J., MIKITYUK K., SUN K., RIMPAULT G.1
"ESFR – analysis of sustainable fuel cycle" 7th Eur. Commission Conf. on Euratom Research and Training in Reactor Systems (FISA 2009), Prague, Czech Republic, 22-24 June 2009, Prague, Czech Republic
[1] CEA, Cadarache, FR

NES Colloquia

ABOLHASSANI-DADRAS S.
"Nuclear materials imaging with electrons: nano-scale", 22 October 2009

BAKO B.
"Dislocation dynamics: from micro- to meso-scale description", 19 February 2009

CHURAKOV S.
"Multiscale modelling: clay as repository barrier", 23 April 2009

DEHBI A.
"Particle transport: in nuclear reactors", 28 May 2009

KOSAKOWSKI G.
"Particle transport: in geological media", 28 May 2009

KRACK M.,
"Multiscale modelling: uranium compounds", 23 April 2009

MARTIN M.
"Nuclear materials imaging with electrons: micro-scale", 22 October 2009

SAMARAS M.
"Multiscale modelling: reactor structure material", 23 April 2009

University Level Teaching

CAVEDON J.-M.
"From Nuclear Structure to Nuclear Energy", Lecture Course, ETHZ, Zurich, Switzerland, Autumn Semester, 2009

CURTI E.
Lectures given in the Course: "Geological Disposal of Radioactive Waste", University of Berne, Switzerland, Summer Semester, 2009

DEGUELDRE C.
"Comportement des radionucleides dans l'environnement", Lecture Course, University of Geneva, Switzerland, Autumn Semester, 2009

DEHBI A.
"Introduction to Lagrangian Methods for Dispersed Flows", "Lagrangian Tracking in Laminar Flows", "Lagrangian Tracking in Turbulent Flows", "Particle-Turbulence Interactions", "Stochastic Methods in Particle Dispersion Modeling", Lectures given in Master Course: Computational Multiphase Thermal Fluid Dynamics, ETHZ, Zurich, Switzerland, Spring Semester, 2009.

GAVILLET D.
"Advanced Topics in Nuclear Reactor Materials", Lectures given in the Nuclear Engineering Master Program, ETHZ, Zurich, Switzerland, Spring Semester, 2009

GAVILLET D.
"Effect of Radiation on Materials – Fission Materials", Lectures given in the Doctoral School Program (MSE-600), EPFL, Lausanne, Switzerland, Summer Semester, 2009

GIMMI T.
"Geochemical Modelling II: Reactive Transport", Master Course in Environmental and Resource Geochemistry, University of Berne, Switzerland, Summer Semester, 2009

GIUST F.
Lectures given in Master Course: Special Topics in Reactor Physics (151-0166-00 G), ETHZ, Zurich, Switzerland, Spring Semester 2009

GÜNTHER-LEOPOLD I.
"Fuel Reprocessing", Lectures given in the Course: Nuclear Energy Systems, ETHZ, Zurich, Switzerland, Summer Semester, 2009

GÜNTHER-LEOPOLD I.
"Kernbrennstoffe", Strategic Exercise given in the Course: Analytische Chemie V, ETHZ, Zurich, Switzerland, 27 October 2009

HUMMEL W.
Lectures given in the Course: Nuclear Energy Systems, ETHZ, Zurich, Switzerland, Summer Semester, 2009

HUMMEL W.
“Landfilling, nuclear repositories and contaminated sites”, Lectures given for degree of Master of Biochemistry and Polution, ETHZ, Zurich, Switzerland, Autumn Semester, 2009

KOLBE E.
“Radioisotopes and Radiation Applications”, Lectures given in the Nuclear Energy Master Program, ETHZ, Zurich, Switzerland, Spring Semester, 2009

KOSAKOWSKI G.
“Geostatistics I & II”, Lecture Course: Master in Applied Environmental Geoscience, University of Tubingen, Germany, Autumn Semester 2009

KRACK M.
“Introduction to the CP2K DFT module QUICKSTEP”, “Accuracy and Efficiency”, Lectures given in the Course: 1st CP2K Tutorial: Enabling the Power of Imagination in MD Simulations”, CECAM-ETHZ, Zurich, Switzerland, 9-13 February 2009

KULIK D.
“Thermodynamic concepts in modeling sorption at the mineral-water interface”, Lecture given at the Short Course in Thermodynamics and Kinetics of Fluid-Rock Interaction, Davos, Switzerland, 19-21 June, 2009

MANERA A.
Lectures given in the Course: Multiphase Flow (151-1906-00L), ETHZ, Zurich, Switzerland, Spring Semester 2009

MANERA A.
Lectures given in the Course: Nuclear Reactors Laboratory Course (151-0162-00L), ETHZ, Zurich, Switzerland, Spring Semester 2009

MANERA A.
“Thermal-Hydraulic System Codes and Hands-On Training”, Lecture Course: Training on TRACE – a best estimate thermal-hydraulics code, ENSI, Villigen PSI, Switzerland, 17-21 August 2009

MIKITYUK K.
“Coupling for reactor dynamics”, Lectures given in the Course: Special topics in reactor physics, part of EPFL/ETHZ Nuclear Engineering Master Program (ETHZ course 151-0166-00L), April-May 2009

MIKITYUK K.
“Lead-cooled fast reactor”, Lecture given at the 2009 Fréderic Joliot/Otto Hahn Summer School, KIT, Karlsruhe, Germany, 26 August - 4 September 2009

NICENO B.
“Essentials of Multiphase Flows”, “Continuum Phase Modeling”, “Wall Modeling”, “Introduction to Multiphase Flow Modeling”, “Two-Fluid Model”, “Interface Tracking Techniques”, “Mechanistic Modeling of Boiling”, Lectures given in Master Course: Computational Multiphase Thermal Fluid Dynamics, ETHZ, Zurich, Switzerland, Spring Semester, 2009

PELLONI S.
“Adjoint flux and perturbation theory”, “Fast reactor neutronics methods”, Lectures given in the Master Course: Special Topics in Reactor Physics, ETHZ, Zurich, Switzerland, Summer Semester, 2009

POUCHON M..
“Radiation Damage”, Lecture given in the Course: Materials for Nuclear Power Plants, ETHZ, Zurich, Switzerland, 11 March 2009

POUCHON M.A.
“Cladding”, Lecture given in the Course: Materials for Nuclear Power Plants, EPFL, Lausanne, Switzerland, 27 October 2009

WEIDMANN N.
“Demand-side measures; supply-side measures: technological learning”, Lecture given in the Course: Renewable Energy Technologies I, ETHZ, Zurich, Switzerland, 29 September 2009

ZIMMERMANN M.A.
“Advanced Topics in Nuclear Reactor Materials”, Lectures given in the Nuclear Master Program, ETHZ, Zürich, Switzerland, Autumn Semester 2009

ZIMMERMANN M.A.
"Nuclear Fuels & Materials", Lectures given in the Nuclear Master Program, EPFL, Lausanne, Switzerland, Autumn Semester 2009

Habilitation, Doctoral, Master and Bachelor Theses

GIRARDIN G.
Development of the Control Assembly Pattern and Dynamic Analysis of the Generation IV Large Gas-Cooled Fast Reactor (GFR), Doctoral Thesis No. 4437, EPFL, Lausanne, 2009

PSI and Other Reports

ALLELEIN H.J.[1], AUVINEN A.[2], BALL J.[3], GUENTAY S., HERRANZ L.[4], HIDAKA A.[5], JONES A.V.[6], KISSANE M.[7], POWERS D.[8], WEBER G.[2]
"State-of-the-Art Report on Nuclear Aerosol", CSNI Report NEA/CSNI/R(2009)5, OECD/NEA, Paris, France, 2009
[1] GRS, Köln, DE
[2] VTT Energy, Espoo, FI
[3] AECL, Chalk River, CA
[4] CIEMAT, Madrid, ES
[5] JAEA, Tokai-mura, JP
[6] JRC, Karlsruhe, DE
[7] IRSN, Cadarache, FR
[8] SNL, Albuquerque, US

BERTSCH J., ALAM A., ZUBLER R.
"Crack Resistance Curve Determination of Zircaloy-4 Cladding", PSI-Bericht Nr. 09-04

DREIER J., SMITH B.L.
"NES: Scientific Highlights 2008" (ISSN 1663-7380), Paul Scherrer Institute, July 2009

MOILANEN P.[1], RITTER S., TANGUY B.[2], BOSCH R.W.[3], ULLBERG M.[4], KERNER Z.[5], VSOLAK R.[6]
"JRA 1 – WP 1.2, Mechanical Testing Devices – Corrosion under Irradiation: Final Report", Final Report, Integrated Infrastructure Initiatives for Material Testing Reactors Innovations (MTR+I3, 6th EU FWP), VTT, 2009
[1] VTT, Helsinki, FI
[2] CEA, Cadarache, FR
[3] SCK-CEN, Brussels, BE
[4] Studsvik Ecosafe, Nykoping, SE
[5] KFKI, Budapest, HU
[6] NRI, Rez, CZ

SEIFERT H.P., RITTER S.
"Environmentally-Assisted Cracking in Austenitic LWR Structural Materials — Final Report of the KORA-I Project", PSI-Bericht Nr. 09-03

General Communications and Public Relations

CAVEDON J.M.
"Une réaction en chaine et son contrôle, ou la vie d'un réacteur nucléaire", Séminaire d'information, Matinée de clarification pour les élus romands, Fédération romande pour l'énergie, Lausanne, Switzerland, 4 May 2009

CAVEDON J.M.
"Abfälle, Externalities, Generation III, Risiken", Energieforum Schweiz, Berne, Switzerland, 21 October 2009

CHAWLA R.
"Les réacteurs d'aujourd'hui, de demain et d'après-demain", Journée d'étude 2009 de l'Association Romande de Radioprotection (ARRAD), Lausanne, Switzerland, 29 October 2009

HARDEGGER P.
"Les impacts comparés des différentes sources de production d'énergie", Séminaire d'information, matinée de clarification pour les élus romands, Fédération romande pour l'énergie, Lausanne, Switzerland, 4 May 2009

HARDEGGER P.
"Produktion elektrischer Energie, Vor- und Nachteile, spezieller Einblick in die Kernenergie", Information Schweiz, Reinach, Switzerland, 29 September 2009

Awards

EPINEY A.
Best paper: Int. Youth Conf. on Energetics 2009 (3rd ENEN PhD Event 2009), 5 June 2009, Budapest, Hungary

PROFF C.
Posterpreis: Microscopy Conference (MC 2009), Aug. 30 – Sept. 4, 2009, Graz, Austria

WIESELQUIST W.A.
Best student paper: Int. Conf. Computational Methods and Reactor Physics, 3-7 May, 2009, Saratoga Springs, USA

Membership of External Committees

CAVEDON J.-M.

- Member of the KNS (Swiss Federal Nuclear Safety Commission)
- Member of the Advisory Board of the French Institut de Radioprotection et de Sûreté Nucléaire IRSN
- Swiss representative to the Committee on the Safety of Nuclear Installations (OECD/CSNI)
- Swiss representative to the Policy Group of the Generation IV International Forum

CHAWLA R.

- Vice Chairman of the OECD/NEA Nuclear Science Committee (NSC)
- Invited Expert on the Scientific Committee of the French CEA's Direction de l'Energie Nucléaire (DEN)
- Member of the Editorial Board of Annals of Nuclear Energy
- Member of the Training and Academic Affairs Committee of the European Nuclear Education Network (ENEN)

DEGUELDRE C.

- Member of the Executive Committee, Symposium N Organiser of the 2010 Meeting of the European Material Research Society (E-MRS), June 7-11, 2010

FROIDEVAL A.

- Appointed member as Swiss user representative of the European Synchrotron Users Organisation (ESUO)

GUENTAY S.

- Vice Chairman of the OECD/NEA Working Group on the Analysis and Management of Acidents (WGAMA)

JANSSENS K.

- Principal Symposium Organizer (as member of the Computational Materials Science Committee of TMS) of "Fatigue: Mechanisms, Theory, Experiments and Industry Practice" at the TMS Annual Meeting, February 15-19, 2009, San Fransisco, CA.

MANERA A.

- Member of the Editorial Board: Science and Technology of Nuclear Installations
- Vice-President of the Schweizerische Gesellschaft der Kernfachleute (SGK)

RITTER S.

- Vice Chairman of the Executive Committee of the European Cooperative Group on Corrosion Monitoring of Nuclear Materials (ECG-COMON)

SAMARAS, M.

- Co-chair of the OECD/NEA Working Party on Multi-Scale Modelling of Fuels and Structural Materials for Nuclear Systems (WPMM) Expert Group on Multiscale Modelling Methods
- Member of the Reviewers' Committee of the Nuclear Engineering and Technology (NET) journal
- Member of the International Advisory Board of CIMTEC 2010: 5th Forum on New Materials

SEIFERT H.P.

- Member of the Executive Committee of the International Cooperative Group on Environmentally Assisted Cracking of Water Reactor Materials (ICG-EAC)

SMITH B.L.

- Chairman of the OECD/NEA Working Group on the Analysis and Management of Acidents (WGAMA) CFD Special Group

ZIMMERMANN M.

- Swiss representative to the Committee for the Safety of Nuclear Installations (OECD/CSNI)
- Chairman of the CSNI Expert Group Safety Margin Assessment and Application (SM2A)
- Swiss representative to the GIF International Expert Group

LIST OF PUBLICATIONS: 2009

The Energy Departments (NES and ENE)

LEA – Laboratory for Energy Systems Analysis

Publications in Books

BURGHERR P., HIRSCHBERG S.
"Wiley Handbook of Science and Technology for Homeland Security", in J.G. Voeller (Ed.): Comparative risk assessment for energy systems: a tool for comprehensive assessment of energy security, John Wiley & Sons Inc., Hoboken NJ, USA, 1-19, 2009 (ISBN 978-0-471-76130-3)

ESKELAND G.[1], CRIQUI P.[2], JOCHEM E.[3], CATENAZZI G.[4], NEUFELDT H.[5], EICHHAMMER W.[6], HELD A.[6], JAKOB M.[4], MIMA S.[2], LINNERUD K.[7], SCHADE W.[6], TRABER T.[8], REITER U., TURTON H., RIVE N.[7], MIDEKSA T.[7]
"Transforming the European Energy System", in M. Hulme, H. Neufeldt, (Eds.): Making Climate Change Work for Us: European Perspectives on Adaption and Mitigation Strategies, Cambridge University Press, 165-199, 2009 (ISBN 978-0-521-11941-2)
[1] NHH, Bergen, NO
[2] University of Grenoble, FR
[3] ETHZ CEPE, Zurich, CH
[4] ETHZ, Zurich, CH
[5] ICRAF, Nairobi, EAK
[6] FhG-ISI, Karlsruhe, DE
[7] CICERO, Oslo, NO
[8] DIW, Berlin, DE

KNOPF, B.[1], EDENHOFER, O.[1], BARKER, T.[2], BAUMSTARK, L.[3], CRIQUI, P.[4], HELD, A.[5], ISAAC, M.[6], JAKOB, M.[6], JOCHEM, E.[7], KITOUS, A.[7], KYPREOS, S., LEIMBACH, M.[1], MAGNÉ, B., MIMA, S.[3], SCHADE, W.[4], SCRIECIU, S.[2], TURTON, H., VAN VUUREN, D.[5]
"The Economics of Low Stabilisation: Implications for Technological Change and Policy", in Hulme, M., Neufeldt, H. (eds.): Making Climate Change Work for Us: European Perspectives on Adaption and Mitigation Strategies, Cambridge University Press, Cambridge University Press, 291-318, 2009 (ISBN 978-0-521-11941-2)
[1] PIK, Potsdam, DE
[2] University of Cambridge, UK
[3] University of Grenoble, FR
[4] FhG-ISI, Karlsruhe, DE
[5] PBL, Bilthoven, NL
[6] ETHZ, Zurich, CH
[7] ENERDATA, Grenoble, FR

Publications in Scientific and Technical Journals

BARALDI P.[1], LIBRIZZI M.[1], ZIO E.[1], PODOFILLINI L., DANG V.N.
"Two Techniques of Sensitivity and Uncertainty Analysis of Fuzzy Expert Systems", Expert Syst. Appl. (ISSN 0957-4174), **36**(10), 12461-12471 (2009)
[1] Polytechnic of Milan, IT

GOOD N.[1], TOPPING D.O.[1], DUPLISSY J., GYSEL M., MEYER N.K., METZGER A., TURNER S.F.[1], BALTENSPERGER U., RISTOVSKI Z.D.[2], WEINGARTNER E., COE H.[1], MCFIGGANS G.[1]
"Widening the gap between measurement and modelling of secondary organic aerosol", Atmos. Chem. Phys. Discuss. (ISSN: 1680-7367), **9**, 22619-22657 (2009)
[1] University of Manchester, UK
[2] Queensland University of Technology, Brisbane, AU

GÜL T., KYPREOS S., TURTON H., BARRETO L.[1]
"An energy-economic scenario analysis of alternative fuels for transport using the global multi-regional MARKAL model", Energy (ISSN 0360-5442), **43**(10), 1423-1437 (2009)
[1] Austrian Energy Agency, Vienna, AT

HUA C.[1], HALIBURTON C.[1], WILHELM E.J., MENDEZ C.J.[1], STEVENS M.B.[1], FOWLER M.[1]FRASER R.A.[1],
"University of Waterloo's Hydrogen Fuel Cell Choice meets the Reality of Canada's Winter by using Model-Based Design", SAE Int. J. Engines, **1**(1), 346-351, 2009 (ISSN 1946-3936)
[1] University of Waterloo, CA

MERCURIO D., PODOFILLINI L., ZIO E.[1], DANG V.N.
"Identification and classification of dynamic event-tree scenarios via possibilistic clustering: application to a steam generator tube rupture event", Accid. Anal. Prev. (ISSN 0001-4575), **41**(6), 1180-1191 (2009)
[1] Polytechnic of Milan, IT

RISTOVSKI Z.D.[1], SUNI T.[2], KULMALA M.[2], BOY M.[2], MEYER N.K., DUPLISSY J., TURNIPSEED A.[3], MORAWSKA L.[1], BALTENPSERGER, U.
"The role of sulphates and organic vapours in new particle formation in a eucalypt forest" Atmos. Chem. Phys. Discuss. (ISSN: 1680-7367), **9**, 17793-17815 (2009)
[1] Queensland University of Technology, Brisbane, AU
[2] University of Helsinki, FI
[3] BAI Group, Boulder, US

ROTH S.[1], HIRSCHBERG S., BAUER C., BURGHERR P., DONES R., HECK T., SCHENLER W.
"Sustainability of electricity supply technology portfolio", Ann. Nucl. Energy (ISSN 0306-4549), **36**, 409-416 (2009)
[1] AXPO, Zurich, CH

WILHELM E., SCHENLER W.
"Heuristic Design of Advanced Drives Analysis of Trade-Offs in Powertrain Electrification", World Electric Vehicle Association Journal (ISSN 2032-6653), **3**, 1-7 (2009)

ZIO E.[1], BARALDI P.[1], LIBRIZZI M.[1], PODOFILLINI L., DANG V.N.
"A fuzzy set-based approach for modeling dependence among human errors", Fuzzy Sets and Systems (ISSN 0165-0114), **160**(13), 1947-1964 (2009)
[1] Polytechnic of Milan, IT

International Conferences with Proceedings

BARALDI P.[1], CONTI M.[1], ZIO E.[1], DANG V.N., PODOFILLINI L.
"A Bayesian Network Model for Dependence Assessment in Human Reliability Analysis", Eur. Safety and Reliability Conference (ESREL 2009), 7-10 September 2009, Prague, Czech Republic, Vol. 1, 223-230, 2009 (ISBN 978-0-415-55509-8)
[1] Polytechnic of Milan, IT

KELLER A.[1], MEYER N.K., SATTLER M.[2], GAEGAUF C.[2], LAUBER A.[3], DOBERE, A.[3], GOOD J.[3], NUSSBAUMER T.[3], HERINGA M.F., DE CARLO P.F., CHIRICO R., RICHARD A., PREVOT A.S.H., BALTENSPERGER U., BURTSCHER H.[1]
"Quantifying wood combustion emissions with on-line methods". 13th ETH-Conference on Combustion Generated Nanoparticles, 22-24 June 2009, Zurich, Switzerland, CD-ROM, 2009
[1] University of Applied Sciences, Windisch, CH
[2] Oekozentrum, Langenbruck, CH
[3] Lucerne University of Applied Sciences and Arts, Horw, CH

MILJEVIC B.[1], MEYER N.K., KELLER A.[2], BURTSCHER H.[2], GOOD J.[3], DOBERER A.[3], LAUBER A.[3], NUSSBAUMER T.[3], HERINGA M.F., RICHARD A., DECARLO P.F., PREVOT A.S.H., FAIRFULL-SMITH K.E.[1], BALTENSPERGER U., BOTTLE S.E.[1], RISTOVSKI Z.D.[1]
"Oxidative potential of logwood and pellet burning particles assessed by a novel profluorescent nitroxide probe", Eur. Aerosol Conf., 6-11 September 2009, Karlsruhe, Germany, CD-ROM, 2009
[1] Queensland University of Technology Brisbane, AU
[2] University of Applied Sciences, Windisch, CH
[3] Lucerne University of Applied Sciences and Arts, Horw, CH

PODOFILLINI L., DANG V.N., BARALDI P.[1], CONTI M.[1], ZIO E.[1]
"A Review of Decision-Tree Models for Assessing Human Reliability Analysis Dependence", Eur. Safety and Reliability Conference (ESREL 2009), 7-10 September 2009, Prague, Czech Republic, Vol. 1, 253-259, 2009 (ISBN 978-0-415-55509-8)
[1] Polytechnic of Milan, IT

SIMONS A., FIRTH S.[1]
"LCA of 100% solar fraction thermal supply to a Swiss apartment building using water-based sensible heat storage", 4th Int. Renewable Energy Storage Conf. (IRES 2009), 24-25 November 2009, Berlin, Germany, CD-ROM, 2009
[1] Loughborough University, UK

WILHELM E., SCHENLER W.
"Heuristic Design of Advanced Drives Analysis of Trade-Offs in Powertrain Electrification", Electric Vehicle Symposium (EVS 24), 12-17 May 2009, Stavanger, Norway, CD-ROM, 2009

Talks delivered at Conferences, Workshops and Specialist Meetings (without Proceedings)

BAUER C.
"CO_2-Abscheidung & Speicherung: Patentlösung für eine nachhaltige Stromversorgung?", Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Kompetenzzentrum für Sicherheit und Risikoprävention (KSR), Winterthur, Switzerland, 27 May 2009

BAUER C.
"Life-cycle analysis: a tool supporting rational decision-making", Carbon Management in Power Generation (CARMA) Workshop on LCA, Risk Assessment, External Costs and MCDA, ETHZ, Zurich, Switzerland, 25 September 2009

BAUER C.
"Wie vergleicht man verschiedene Verkehrsmittel? — Methodik und Datengrundlagen der Ökobilanz-Datenbank ecoinvent", Tagung: Umweltvergleich von Verkehrsträgern des SBB Umweltcenters, Zurich, Switzerland, 24 November 2009

BAUER C., HECK T.
"Carbon capture and storage: life cycle assessment and external costs of future fossil power generation", 4th Int. Conf. on Life Cycle Management, Cape Town, South Africa, 6-9 September 2009

BURGHERR P.
"Comparative assessment of accidents in the energy sector: risk indicators and monetization issues", IRSN Workshop on Measuring the Cost of Disasters, Zurich, Switzerland, 26 May 2009

BURGHERR P., HIRSCHBERG S., ECKLE P.
"Comparative assessment of accident risks in the energy sector: results from NEEDS and outlook", Swiss Federal Office of Civil Protection (BABS), Berne, Switzerland, 20 October 2009

ECKLE P., BURGHERR P., HIRSCHBERG S.
"Risk Analysis Methods", Swiss Federal Office of Civil Protection (BABS), Berne, Switzerland, 20 October 2009

GÜL T., TURTON H.
"Illustrating perspectives of energy and mobility", Int. Advanced Mobility Forum (IAMF 2009), Geneva, Switzerland, 10-12 March 2009

HECK T.
"Environmental impacts and external costs methods – tutorial overview", Tutorial Workshop, Institut für Atmosphäre und Klima (IAC), ETHZ, Zurich, Switzerland, 12 January 2009

HECK T.
"Assessment of environmental impacts and external costs related to air pollution emissions", Invited Talk, Kolloquium Atmosphäre und Klima, ETHZ, Zurich, Switzerland, 19 October 2009

HECK T.
"Regionalization and parameterization of LCA and LCIA of energy systems", Life Cycle Assessment (LCA) Discussion Forum, ETHZ, Zurich, Switzerland, 13 November 2009

HIRSCHBERG S.
"Technology assessment and stakeholder perspectives", Invited Talk, Policy Session, Conf, on External Costs of Energy Technologies, Eur. Economic and Social Committee, Brussels, Belgium, 16-17 February 2009

HIRSCHBERG S.
"Energy technology roadmap and stakeholder perspectives", Invited Talk, R&D Session, Conf. on External Costs of Energy Technologies, Eur. Economic and Social Committee, Brussels, Belgium, 16-17 February 2009

HIRSCHBERG S.
"Fuels — a competition between resources and global warming", Int. Advanced Mobility Forum (IAMF 2009), Geneva, Switzerland, 10-12 March 2009

HIRSCHBERG S.
"State-of-the-art, technology-specific indicators for sustainability asssessment: methodology, results and options for aggregation", "Multi-criteria decisions analysis", Technical Meeting on Defining and Selecting Integrated Indicators for Nuclear Power Development, IAEA, Vienna, Austria, 24-27 March 2009

HIRSCHBERG S.
"Optionen für die Elektrizitätsversorgung in der Schweiz", Invited Talk, Wissenmanagement ENSI, ENSI, Würenlingen, Switzerland, 5 June 2009

HIRSCHBERG S.
"Multi-criteria decision analysis of power systems", Invited Talk, 38th Life Cycle Analysis (LCA) Discussion Forum, ETHZ, Zurich, Switzerland, 19 June 2009

HIRSCHBERG S.
"Life-cycle assessment activities at the Paul Scherrer Institute", Seminar in connection to the visit by the Federation of Thai Industries, EMPA, Dubendorf, Switzerland, 20 August 2009

HIRSCHBERG S.
"Externalities in the energy system", IAEA Scientific Forum on Energy for Development, Invited Talk, IAEA, Vienna, 15-16 September 2009

HIRSCHBERG S.
"Global energy challenges and Swiss supply system", Carbon Management in Power Generation (CARMA) Workshop, ETHZ, Zurich, Switzerland, 25 September 2009

HIRSCHBERG S.
"Technology-specific indicators for sustainability assessment & MCDA: overview", "Alternative criteria structure and sustainability indicators", Technical Meeting on Experience with the Application of Integrated Indicators for Nuclear Power Development, IAEA, Vienna, Austria, 27-30 October 2009

HIRSCHBERG S.
"Swiss scientific perspective on climate change and related issues", Invited Talk, European Nuclear Council Meeting, ATEL, Zurich Airport, Switzerland, 5 November 2009

HIRSCHBERG S., BURGHERR P.
"Risikoanlayse verschiedener Energie-Technologien", Invited Talk, Axpo Executive Meeting, AXPO, Zurich, Switzerland, 18 March 2009

HIRSCHBERG S., BURGHERR P.
"Comparative risk assessment", Carbon Management in Power Generation (CARMA) Workshop, ETHZ, Zurich, Switzerland, 25 September 2009

HIRSCHBERG S., BURGHERR P.
"Comparative assessment of severe accidents associated with various energy technologies", Invited Talk, Int. Conf. on Nuclear Power: Technology, Investors, Financing, Most Wanted! Conferences & Events, Warsaw, Poland, 19-20 November 2009

HIRSCHBERG S., HECK T.
"External cost assessment", Carbon Management in Power Generation (CARMA) Workshop, ETHZ, Zurich, Switzerland, 25 September 2009

KYPREOS S., CUOMO V.[1], LOULOU R.[2], BLESL M.[3], COSMI C.[1], SALVIA M.[1], VAN REGEMORTER D.[4]
"European Energy and Climate Change Scenarios Evaluated with the TIMES Model for the EU-NEEDS Project", Invited Talk, ATINER 4th Int. Symp. on Environment, Athens, Greece, 21-24 May 2009
[1] IMAA, Tito Scalo, IT
[2] McGill University, Montreal, CA
[3] University of Stuttgart, DE
[4] University of Leuven, BE

KYPREOS S., TURTON H.
"Climate Change Scenarios evaluated with MERGE-ETL and Technology Transfer Protocols", Int. Energy Workshop 2009, Venice, Italy, 17 June 2009

MARCUCCI A.
"NCCR Young Researchers Meeting", NCCR Climate Young Researchers Meeting, National Centres of Competence in Research (NCCR) Climate, Murten, 4 June, 2009

MARCUCCI A.
"Mitigation and sustainable energy strategies under global uncertainty", National Centres of Competence in Research (NCCR) Climate WP4 and NCCR Trade Joint Workshop, Berne, 27 November, 2009.

MEYER N.K.
"Emissions from Diesel and CNG Buses", HarmonE: Today's Technology, Tomorrow's Drivers, IIASA, Vienna, Austria, 18 May 2009

MEYER N.K., DUPLISSY J.[1], GYSEL M., METZGER A.[1], WEINGARTNER E., PREVOT A., ALFARRA M., GOOD N.[1], DOMMEN J., FLETCHER C.[2], MCFIGGANS G.[3], BALTENSPERGER U., JONSSON A.[4], HALLQUIST M.[4], RISTOVSKI Z.[1]
"Analysis of the hygroscopic and volatile properties of ammonium sulphate seeded and un-seeded SOA particles", Final project meeting: Integration of European Simulation Chambers for Investigating Atmospheric Processes (EUROCHAMP), Rügen, Germany, 13-15 May 2009
[1] Aachen University of Technology, DE
[2] Queensland University of Technology, AU
[3] University of Manchester, UK
[4] University of Gothenburg, SE

MEYER N.K., HECK T.
"Towards assessments of the health and climate impacts of biomass combustion emissions", Energy Use & Emissions in a Co-Benefits World, Workshop I, IIASA, Vienna, Austria, 18 May 2009

MEYER N.K., HECK T.
"Towards assessment of health & environmental impacts of biomass combustion", Impact of Biomass Burning Aerosol on Air Quality and Climate (IMBALANCE) Workshop, ETHZ, Zurich, Switzerland, 27 May 2009

MEYER N.K., HECK T.
"Towards assessments of the health and climate impacts of biomass combustion emissions", Invited Talk, Bundesamt für Umwelt (BAFU) Workshop: emission factors from wood burning, Lucerne, Switzerland, 3 July 2009

REITER U.
"Climate change mitigation: challenges for the European electricity sector", Invited Talk, Int. Energy Workshop 2009 (IEW), Venice, Italy, 17-19 June 2009

REITER U., TURTON H.
"Climate change adaptation scenario for the European electricity sector", IARU Int. Sci. Congress on Climate Change: Global Risks, Challenges and Decisions, Copenhagen, Denmark, 10-12 March 2009

WILHELM E., SCHENLER W.
"Heuristics for the Design of Advanced Powertrains: Strategies for Manufacturers", Int. Advanced Mobility Forum (IAMF 2009), 10-12 March 2009, Geneva, Switzerland, 2009

WILHELM E., SCHENLER W.
"Losing Weight to Save Energy: How Advanced Materials could affect Tomorrow's Vehicle Fleet", EMPA PhD Symposium, EMPA, Dübendorf, Switzerland, 19 November 2009

WOKAUN A., TURTON H.
"Die Bedeutung von Klimazielen auf dem Weg zu einer Niedrigenergie-Gesellschaft, Variabilität, Vorhersagbarkeit und Risiken des Klimas: acht Jahre NFS Klima", Invited Talk, NCCR Climate Conf., Berne, 12 June 2009

University Level Teaching

BURGHERR P.
"Severe accident risks in the energy sector: a comparative analysis and new developments", Lecture given in the Course: Climate and Energy, University of Geneva, Switzerland, 7 Dec. 2009

DANG V.N.
"Human Reliability Analysis (HRA): Methods and Case Study", "Mini-PSA", Lectures given in the Course: Certificate of Advanced Studies (CAS), in ETHZ Risiko und Sicherheit, Modul V2: Komplexe Systeme — Zuverlässigkeit, Risiko und Verletzbarkeit komplexer Anlagen und Infrastrukturen, ETHZ, Zurich, Switzerland, 15-17 April 2009

HIRSCHBERG S.
"Introduction, module structure and goals", "PSA methodology overview", "Dependencies and common cause failures", "PSA/QRA limitations and development trends", Lectures given in the Course: Certificate of Advanced Studies (CAS) ETHZ in Risiko und Sicherheit, Zuverlässigkeit und Verletzbarkeit komplexer Anlagen und Infrastrukturen (V2, Teil 1), ETHZ, Zurich, Switzerland, 15-17 April 2009

HIRSCHBERG S.
"Comprehensive comparative assessment of energy systems: framework, risk-relevant results, multi-criteria decision analysis and tools". Lecture given in the Course: Certificate of Advanced Studies (CAS) ETHZ in Risiko und Sicherheit, Zuverlässigkeit und Verletzbarkeit komplexer Anlagen und Infrastrukturen (V2, Teil 1), ETHZ, Zurich, Switzerland, 29-30 April 2009

HIRSCHBERG S., BAUER C.
"Nuclear Energy and Sustainability, Lecture 1: Life Cycle Assessment", Lecture given in the Course: Nuclear Energy Systems, ETHZ, Zurich, Switzerland, 7 May 2009

HIRSCHBERG S.
"Nuclear Energy and Sustainability, Lecture 2: Sustainability Assessment", Lecture given in the Course: Nuclear Energy Systems, ETHZ, Zurich, Switzerland, 14 May 2009

HIRSCHBERG S.
"Nuclear Energy and Sustainability, Lecture 3: Energy Supply Challenges and Role of Nuclear Energy", Lecture given in the Course: Nuclear Energy Systems, ETHZ, Zurich, Switzerland, 28 May 2009

HIRSCHBERG S., BAUER C.
"Life-Cycle Analysis and other Approaches for Sustainability Assessment", "Life Cycle Analysis and Multi-Criteria Assessment of Energy Systems in View of Sustainability Indicators", Lectures given in the Course: Renewable Energy Technologies I, ETHZ, Zurich, Switzerland, 24 November 2009

HIRSCHBERG S.
"Introduction: Overall Approach, Risk Issues and Technologies", "PSA Methodology Overview", "Comparative Perspective on Risks", Lectures given in the Course: Climate and Energy, Centre des sciences naturelles de l'environnement, University of Geneva, Switzerland, 7 December 2009

MARCUCCI A.
"The global energy system: energy demand and supply climate protection goals; potential of renewables", Exercise given in the Course: Renewable Energy Technologies I, ETHZ, Zurich, Switzerland, 22 September 2009

PODOFILLINI L.
"Genetic algorithms for the optimization of industrial systems: examples of applications on computer", Lecture given in the Course: Innovative techniques for the evaluation of the reliability and availability of industrial plants, Polytechnic of Milan, Italy, 21-24 September 2009

PODOFILLINI L.
"Human Reliability Analysis (HRA) – An Introduction", Lecture given in the Course: Risk Analysis and Risk Assessment, Zürcher Hochschule für Angewandte Wissenschaften (ZHAW), Winterthur, Switzerland, 24 November 2009

Habilitation, Doctoral, Master and Bachelor Theses

CONTI M.
"A Bayesian Network for Quantifying Human Error Probabilities in Successive Emergency Tasks", Masters Thesis, Politecnico di Milano, Italy, 2009

RUOSS F.
"Key factors affecting the deployment of electricity generation technologies in energy technology scenarios", Masters Thesis, University of Berne, 2009

PSI and Other Reports

BAUER C., SCHENLER W., HIRSCHBERG S., MARCUCCI A., BURGHERR P., ROTH S.[1], ZEPF N.[1]
"Systemvergleich von Strom- und Wärmever-sorgung mit zentralen und dezentralen Anlagen. Eine Studie im Rahmen des "Energietrialog Schweiz", Paul Scherrer Institute, 2009
[1] AXPO, Zürich, CH

DONES R., BAUER C., DOKA G.[1]
"Sachbilanzen von Energiesystemen: Grundlagen für den ökologischen Vergleich von Energiesystemen und den Einbezug von Energiesystemen in Ökobilanzen für die Schweiz", Final report ecoinvent, 6-VII, v2.1, PSI & Swiss Centre for Life-Cycle Inventories, 2009
[1] Doka Life Cycle Assesments, Zurich, CH

GÜL T., TURTON H.
"Illustrating perspectives of energy and mobility", PSI-Bericht Nr. 09-08

LOIS E.[1], DANG V.N., FORESTER J.[2], BROBERG H.[3], MASSAIU S.[3], HILDEBRANDT M.[3], BRAARUD P.[3], PARRY G.[1], JULIUS J.[4], BORING R.[2], MÄNNISTÖ I.[3], BYE A.[3]
"International HRA Empirical Study – Description of Overall Approach and First Pilot Results from Comparing HRA Methods to Simulator Data", NUREG/IA-0216, Vol. 1, US NRC, Washington DC, Nov. 2009
[1] US NRC, Rockville, US
[2] SNL, Albuquerque, US
[3] OECD Halden Reactor Project, Halden, NO
[4] US NRC, Bethesda, US
[5] Scientech, EPRI, US

REER B.
"Outline of a Method for Quantifying Errors of Commission", report prepared for the Swiss Federal Nuclear Safety Inspectorate (ENSI), LEA 09-302, November 2009

REER B.
"An Approach for Ranking EOC Situations Based on Situational Factors", report prepared for the Swiss Federal Nuclear Safety Inspectorate (ENSI), LEA 09-304, November 2009

REER B., DANG V.N.
"Situational Features of Errors of Commission identified from Operating Experience", report prepared for the Swiss Federal Nuclear Safety Inspectorate (ENSI), LEA 09-303, November 2009

RUOSS F., TURTON H., HIRSCHBERG S.
"Key Factors Affecting the Deployment of Electricity Generation Technologies in Energy Technology Scenarios", PSI-Bericht Nr. 09-11

WEIDMANN N., TURTON H., WOKAUN A.
"Case Studies of the Swiss Energy System – Sensitivity to Scenario Assumptions Assessed with the Swiss MARKAL Model", Energie Trialog Schweiz, www.energietrialog.ch, 2009

General Communications and Public Relations

BURGHERR P.
"Accident risks in the energy sector: ENSAD database and tanker oil spills", Int. Maritime Organization (IMO), London, United Kingdom, 26 January 2009

BURGHERR P.
"Ganzheitliche Betrachtung von Energiesystemen: auf der Suche nach der besten Energiequelle", PSI Forum: Schweizerische Gesellschaft für Hydrologie und Limnologie (SGHL), PSI, 19 May, 2009

BURGHERR P.
"Nuclear Energy: Overview – Current Status – Future Development", PSI Forum: Zurich International Women's Association (ZIWA), PSI, 22 January, 2009

BURGHERR P., HIRSCHBERG S.
"Comparative risk assessment of energy technologies: accident risks in a sustainability perspective", Societé Française d'Energie Nucléaire (SFEN), Paris, France, 4 June 2009

HIRSCHBERG S.
"Herausforderungen aus der Sicht der Energieversorgung", Schweizer Haustech Planertag, Haustech, Zurich, Switzerland, 26 February 2009

HIRSCHBERG S.
"Role of Energy Efficiency and Electricity Generation Technologies in the Future Swiss Energy Supply", SGK Apéro, Schweizerische Gesellschaft der Kernfachleute, Baden, Switzerland, 5 May 2009

HIRSCHBERG S.
"Szenarien für die Entwicklung eines wettbewerbsfähigen Energiesystems unter Berücksichtigung von Klimaschutzzielen und Versorgungssicherheit", NAGRA Colloquium, Wettingen, Switzerland, 31 August 2009

HIRSCHBERG S.
"Szenarien für die Entwicklung eines wettbewerbsfähigen Energiesystems unter Berücksichtigung von Klimaschutzzielen", Energieabend Ryfsaal Mellingen, 17 March, 2009

HIRSCHBERG S., BURGHERR P.
"Risiken der Kernenergie im Vergleich zu anderen Energiequellen", Invited Talk, ENSI-Rat, ENSI, Würenlingen, Switzerland, 27 May 2009

HIRSCHBERG S., BURGHERR P.
"Energy system risks in perspective", Invited Talk, 25th Anniversary of Relcon Scandpower AB, Relcon Scandpower AB, Tammsvik, Sweden, 11 June 2009

Awards

KARANKI D.R.
Outstanding researcher award for research in Uncertainty Management and Dynamic Reliability in PSA of NPPs, 4th Int. Conf. on Quality, Reliability and Infocom Technology (ICQRIT 2009), 18-20 December, 2009, New Delhi, India

Membership of External Committees

HIRSCHBERG S.

- Member of the Review Panel for the Helmholtz Programme “Technology, Innovation and Society”

TURTON H.

- Member of the Programme Committee for the Conference on the International Dimensions of Climate Policies, Berne, Switzerland, 21-23 January 2009

LIST OF PUBLICATIONS 2009

ENE – General Energy

PROJECT COLLABORATIONS WITH EXTERNAL PARTNERS

ALLIANCE FOR GLOBAL SUSTAINABILITY

Projektleiter: M. Zimmermann, S. Ulli-Beer
Advanced Energy-Efficient Renovation of Buildings
(Project Part: Diffusion dynamics of energy efficient renovations)
with IEA, SNF, BFE, Stadt Zürich, Novatlantis

ASTRA / BAFU

Projektleiter: R. Gehrig[1], N. Bukowiecki, U. Baltensperger, M. Furger
PM10-Emissionsfaktoren von Abriebspartikeln des Strassenverkehrs (APART)
[1] EMPA Dübendorf

AXPO NATURSTROMFONDS

Projektleiter: S.M.A. Biollaz
Holz - Brennstoffzelle

Projektleiter: S.M.A. Biollaz
Graskraftwerk

Projektleiter: F. Vogel
Effiziente Vergasung und Verstromung von Gülle

BAFU

Projektleiter: S. Andreani, J. Keller, A.S.H. Prévôt
Aerosol-Modelling – Schadstoffbilanzen

Projektleiter: S. Andreani, A.S.H. Prévôt
Modellierung der Luftqualität mit CAMX für drei Episoden

Projektleiter: A.S.H. Prévôt, U. Baltensperger
Aerosolmassenspektrometer-Messungen während der EMEP-Kampagne

BAFU / Kantone

Projektleiter: A.S.H. Prévôt, U. Baltensperger
^{14}C im Feinstaub der Schweiz

BFE

Projektleiter: S.M.A. Biollaz
Experimenteller Nachweis des Methanverlusts von Biogas-Aufbereitungsanlagen

Projektleiter: F.N. Büchi
Cal.PEF-CH: Modelbased investigation of PE fuel cell performance with focus on porous layer properties
with ZHAW, Winterthur

Projektleiter: F.N. Büchi
Röntgen Mikro-Tomographie an Polymerelektrolyt-Brennstoffzellen

Projektleiter: F.N. Büchi
Gasanalysis in polymer electrolyte fuel cells

Projektleiter: T. Gerber
Investigation of reactions and species dominating low temperature combustion

Projektleiter: L. Gubler
Lebensdauer-Limitierungen von Brennstoffzellen-Membranen: Mechanismen, Methoden und Innovationen

Projektleiter: L. Gubler, I.A. Schneider
go.PEF-CH: Enhancing PEFC durability and reliability under application-relevant conditions
Partner: Berner Fachhochschule Technik und Informatik (BFH-TI, Biel BE), CEKA Elektrowerkzeuge AG & Co. KG (Wattwil SG), MES-DEA SA (Stabio TI)

Projektleiter: P. Jansohn
Verbrennung von wasserstoffhaltigen Synthesegasen: Grundlagen und Designregeln für Gasturbinen

Projektleiter: R. Kaufmann-Hayoz, S. Ulli-Beer
E-Scooter, Marktentwicklung, Analyse der Akteure, E-Scooter Technologie, Ladestationen, LCA, Verbrauchsmessungen, Auswertung von Alltagserfahrungen, Fördermassnahmen
Forschungsprojekt New Ride with Uni Bern, Interface, EMPA & U. Schwegler

Projektleiter: Ch. Ludwig
MOPSID: Monitoring of process gases with a surface ionization detector

Projektleiter: A. Meier
IEA-SolarPACES (International Energy Agency – Solar Power and Chemical Energy Systems)
IEA Implementing Agreement

Projektleiter: A. Meier
Solar Production of Zinc and Hydrogen – Reactor Optimization for Scale-up
Research Project

Projektleiter: A.S.H. Prévôt
Erweiterte Partikelanalytik für Holzfeuerungsabgase

Projektleiter: T. Schildhauer
Hochtemperatur-Entschwefelung für biogene Produktgase - Design und Optimierung

Projektleiter: T.J. Schildhauer
Design und Optimierung der Hochtemperatur-Entschwefelung für den Prozess „Methan aus Holz“

Projektleiter: F. Vogel
Optimierung der Hydrolyse und Salzabtrennung bei der hydrothermalen Vergasung von Biomasse

BFS (Bayerische Forschungsstiftung)

Projektleiter: O. Kröcher, Ch. Gerhart[1]
NO_x-Reduzierung im motorischen Abgas mit Guanidinsalzen
Prof. Dr. Th. Sattelmayer, Lehrstuhl für Thermodynamik, TU München, Germany
Prof. Dr. G. Wachtmeister, Lehrstuhl für Verbrennungskraftmaschinen, TU München, Germany
[1] AlzChem Trostberg GmbH, Germany
NIGU Chemie GmbH, Germany

BGM

Projektleiter: W. Durisch
Thermoelectric Generator
Wirtschaftsministerium Baden-Württemberg
Birgit Gerischer Marketing, BGM, Kirchseeon, Germany

CCEM

Projektleiter: S.M.A. Biollaz
ARRMAT (Attrition resistant reactive bed materials)
Partner: EMPA

Projektleiter: S.M.A. Biollaz, J. Wochele
WOODGAS SOFC (Integrated Biomass - Solid Oxide Fuell Cell Cogeneration)
WP2: Gas Analysis

Projektleiter: F.N. Büchi, S. Ulli-Beer
*hy.muve: Development of **hy**drogen powered **mu**nicipal **ve**hicle*
with EMPA Dübendorf and Industrial Partners

Projektleiter: P. Dimopoulos[1], M. Ammann, U. Baltensperger, K. Boulouchos[2], H. Burtscher[3], N. Heeb[1], O. Kröcher, M. Mohr[1]
NEADS (Next Generation Exhaust Aftertreatment for Diesel Propulsion Systems)
[1] EMPA Dübendorf
[2] ETH Zürich
[3] FHNW Windisch

Projektleiter: P. Jansohn, I. Mantzaras
Carbon management in power generation (CARMA)

Projektleiter: I. Mantzaras
Computational engineering of multiscale transport in small-scale surface based energy conversion (CEMTEC)

Projektleiter: S. Stucki
2nd Generation Biogas
Partner: EMPA, ETHZ, EPFL, EAWAG, WSL

Projektleiter: A. Wokaun
Transition to Hydrogen Based Transportation
Project Part: Dynamics of transportation technology development and diffusion (Projektleiter: S. Ulli-Beer)
in collaboration with MIT (Alliance for Global Sustainability)

CCES

Projektleiter: U. Lohmann[1], Th. Peter[1], U. Baltensperger, Th. Heck, Ch. Hüglin[2], H. Burtscher[3], I. Bey[4]
IMBALANCE (IMpact of Biomass burning Aerosol on Air quality aNd ClimatE)
[1] ETH Zürich
[2] EMPA Dübendorf
[3] FHNW Windisch
[4] EPF Lausanne

CCMX

Projektleiter: J. Rupp, L. Gauckler[1], T. Lippert, K. Conder, T. Graule[2], S. Pratsinis[1]
NANCER (*Nanocrystalline ceramic thin film coating without sintering*)
[1] ETH Zürich
[2] EMPA Dübendorf

COST

Projektleiter: T. Gerber
Detailed chemical kinetic models for cleaner combustion, CM0901

Energie Trialog Schweiz

Projektleiter: A. Wokaun, Ph. Dietrich, S. Hirschberg
Studies on Energy Efficiency, Renewable Electricity, Scenarios, Multi-Criteria Decision Analysis

ETH

Projektleiter: D. Cziczo[1,2], E. Weingartner, U. Baltensperger
The relationship between aerosol chemical composition and hygroscopic growth
[1] ETH Zürich
[2] Pacific Northwest National Laboratory, Richland, USA

ETH-Rat

Projektleiter: A. Wokaun
- *Erlebnisraum Nachhaltige Mobilität Basel*
- *Erdgas- / Biogasfahrzeuge*
- *Wasserstoff-Fahrzeuge*

novatlantis – Nachhaltigkeit im ETH Bereich

EU

Projektleiter: U. Baltensperger, J. Dommen
EUROCHAMP-2 (Integration of European Simulation Chambers for Investigating Atmospheric Processes)

Projektleiter: U. Baltensperger, E. Weingartner, M. Gysel
EUSAAR (European Supersites for Atmospheric Aerosol Research)

Projektleiter: U. Baltensperger, A.S.H. Prévôt, E. Weingartner
EUCAARI (European Integrated project on Aerosol Cloud Climate and Air Quality Interactions)

Projektleiter: U. Baltensperger, E. Weingartner
CLOUD-ITN (Cosmics Leaving OUtdoor Droplets, Initial Training Network)

Projektleiter: U. Baltensperger, A.S.H. Prévôt, E. Weingartner
MEGAPOLI (Emissions, urban, regional and Global Atmospheric POLlution and climate effects, and Integrated tools for assessment and mitigation)

Projektleiter: S.M.A. Biollaz
Bio-SNG

Projektleiter: P. Jansohn
HERCULES-B (High efficiency engine R&D on combustion with ultra low emissions for ships)

Projektleiter: P. Jansohn
H2-IGCC (Low emission gas turbine technology for hydrogen-rich syngas)

Projektleiter: Ch. Ludwig
PROSUITE

Projektleiter: A. Meier
SOLHYCARB (Hydrogen from Solar Thermal Energy: High Temperature Solar Chemical Reactor for Co-Production of Hydrogen and Carbon Black from Natural Gas Cracking)

Projektleiter: P. Novák
MAHEATT

Projektleiter: A.S.H. Prévôt
CIRCE (Climate change and Impact Research: The Mediterranean Environment)

Projektleiter: A.S.H. Prévôt, E. Weingartner
EUROSTARS (Fast and loading compensated Aethalometer-an instrument for real time measurement of light absorbing carbonaceous aerosol)

Projektleiter: M. Saurer
MILLENNIUM (European climate of the last millennium)

Projektleiter: T. Schildhauer
AER-GAS II

Projektleiter: E. Weingartner, U. Baltensperger
GeoMon (Global Earth Observation and Monitoring of the atmosphere)

Projektleiter: Ch. Wieckert
SFERA (Solar Facilities for the European Research Area)

FVV (Forschungsvereinigung Verbrennungskraftmaschinen)

Projektleiter: O. Kröcher
Differenzierte Mikroanalytik von Particulate Matter (PM)

Industry

Projektleiter: P. Boillat, G.G. Scherer
Diagnostics of polymer electrolyte fuel cells
Automotive Industry

Projektleiter: J.-F. Colin
Oxide für Lithiumionen-Batterien
BASF SE, Ludwigshafen, Germany

Projektleiter: T. Colinart, F.N. Büchi
Diagnostics of polymer electrolyte fuel cells
Automotive Industry

Projektleiter: O. Kröcher, R. Althoff[1]
Development of new metal-exchanged zeolites for NH_3/urea-SCR
[1] Süd-Chemie AG, Germany

Projektleiter: O. Kröcher
Ammonium nitrate formation on Fe- and Cu-zeolite SCR catalysts
Abgaszentrum der Automobilindustrie (ADA), Germany

Projektleiter: O. Kröcher
Investigation of the decomposition of urea in the SCR process
Anonymous industry partners, France

Projektleiter: O. Kröcher
Development of a TG-FTIR system for exhaust gas aftertreatment
Mettler-Toledo AG
Thermo Fisher AG

Projektleiter: O. Kröcher, A. Johansson[1]
Development and parameterization of a catalyst model for NO/NO_2 SCR
[1] Swenox AB, Schweden

Projektleiter: O. Kröcher
Thermal stability of vanadium oxide species on V_2O_5 / WO_3-TiO_2 SCR catalysts
MTU Friedrichshafen GmbH, Germany
Porzellanfabrik Frauenthal GmbH, Austria

Projektleiter: Ch. Ludwig, S. Stucki
KVA plus
Stiftung Autorecycling Schweiz, SARS

Projektleiter: W. Märkle
Graphite für Lithiumionen-Batterien
TIMCAL SA, Bodio

Projektleiter: P. Novák
Projekt HE-Lion
BASF SE, Ludwigshafen, Germany

Projektleiter: S. Rabe
Confidential
Methanol Casale

HSK

Projektleiter: F. Gassmann
ADPIC- Aktualisierung

KTI

Projektleiter: I. Mantzaras
Sequential Combustion Technology for Gas Turbine Power Generation with CO_2 Mitigation

Projektleiter: Ch. Wieckert
SOLSYN (Solar for high quality syngas from low grade fuels or from wastes as fuel for cement kilns)

METEO SCHWEIZ

Projektleiter: U. Baltensperger, E. Weingartner, M. Gysel
GAW-CH (Aerosol Monitoring Programm auf dem Jungfraujoch)

Projektleiter: U. Baltensperger, E. Weingartner, M. Gysel
Cloud Condensation Nuclei and Carbonaceous Aerosol Characterisation at the Jungfraujoch Research Station

MIT

Projektleiter: F. Vogel
Ecogas: Nutrient salt recovery during conversion of wet biomass into methane

NATIONALFONDS

Projektleiter: U. Baltensperger
Investigation of Secondary Organic Aerosol Formation in the PSI Smog Chamber

Projektleiter: A. Foelske-Schmitz
Degradation mechanisms of electro-catalysts used in polymer electrolyte fuel cells

Projektleiter: M. Geiser Kamber[1], M. Kalberer[2], J. Ricka[1], J. Dommen
From aerosol to health effects: Mobile system for controlled, standardized studies of health-effects by inhaled (nano)particles and gases
[1] University of Bern
[2] University of Cambridge, UK

Projektleiter: M. Gysel
Soot Nanoparticles in the Past and Present Atmosphere

Projektleiter: Ch. Körner[1], R.T.W. Siegwolf
Swiss Canopy Crane Project: CO_2–enrichment
[1] University of Basel

Projektleiter: R. Kötz
Graphite oxides and graphene for electrochemical energy storage

Projektleiter: O. Kröcher
Investigation of the selective catalytic reduction of NO_x on diesel soot

Projektleiter: T. Lippert, L. Gauckler
Single crystalline films of ion conductors

Projektleiter: Ch. Ludwig
Seasonality of Municipal Waste Generation and Composition and Corresponding Fluctuations of Various Environmental Indicators for Waste Management and Treatment Facilities

Projektleiter: P. Maire
Synthetic solid electrolyte interphase on carbon electrodes for lithium-ion batteries

Projektleiter: M. Nachtegaal
Facility for in situ analysis of functional materials
Partner: ETH Zürich

Projektleiter: P. Novák, R. Kötz, T. Lippert, R. Nesper[1]
Advanced materials for efficient portable energy supplies
[1] ETH Zürich

Projektleiter: F. Nüesch, M. Nagel[1], T. Lippert, A. Wokaun
Fabrication of patterned organic multilayer devices using dynamic release layer assisted Laser Induced Forward Transfer
[1] EMPA Dübendorf

Projektleiter: P.P. Radi
Characterization of Vibrationally and Rotationally Excited Molecules by Two-Color Resonant Four-Wave Mixing

Projektleiter: M. Rossi
Elementary Chemistry at the Gas-condensed Phase Interface: Implications for Atmospheric Science

Projektleiter: M. Saurer, R.T.W. Siegwolf
Climatic changes, tree-ring growth and C- and O-isotope variations along longitudinal transects in Siberia and in the Urals

Projektleiter: R.T.W. Siegwolf, J. Dommen, U. Baltensperger
REQUIP (Compound specific isotope analyses in ecological and aerosol research

Projektleiter: A. Wokaun
NCCR-Climate
Project Task 4.1: Energy Technology Strategies

Projektleiter: A. Wokaun, T. Lippert
Thin Metal Oxide Films by PLD: “Tracing” the oxygen and understanding its role

NATO

Projektleiter: M. Dinescu[1], E. Verona[2], T. Lippert
Polymers based piezoelectric sensor array for chemical warfare agents detection
[1] National Institute for Lasers, Plasma and Radiation Physics, Romania
[2] CNR-IDAC Rome, Italy

NCCR: MANEP

Projektleiter (MaNEP): L. Schlapbach[1], A. Weidenkaff[1], T. Lippert, A. Wokaun
Plasma enhanced anionic substitution (PEAS) for the generation of perovskite phases with different properties
[1] EMPA Dübendorf

Projektleiter (MaNEP): C. Niedermayer, C.W. Schneider
Electronic properties of oxide superconductors and related materials

NOVATLANTIS

Projektleiter: A. Wokaun, S.F. Lienin, S. Ulli-Beer, C. Bach
Erlebnisraum Mobilität: Aufbau einer sozio-technologischen Feldversuchsumgebung
Nachhaltigkeit im ETH Bereich

Projektleiter: S. Perret, S.F. Lienin, S. Ulli-Beer
Innovative Fahrzeugflotte Basel
Nachhaltigkeit im ETH Bereich

OSTLUFT

Projektleiter: A.S.H. Prévôt
Mobile Aerosolmassenspektrometer-Messungen im Rheintal und in Zürich

SBF

Projektleiter: U. Baltensperger, A.S.H. Prévôt
ACCENT (Atmospheric Composition Change, the European Network of Exellence)

Projektleiter: J. Keller
COST 728 (Linking meteorological and photo-chemical dispersion models: development and tests of an interface with improved turbulence schemes)

Projektleiter: R.T.W. Siegwolf
COST 639 (Carbon cycling in alpine soils in a warmer world)

SNF-PdO

Projektleiter: I. Mantzaras, I. Czekaj
Computational modeling of Pd/PdOx transformation in redox catalytic cycles

SWISS AGENCY FOR DEVELOPMENT AND COOPERATION (SDC)

Projektleiter: Ch. Ludwig
Relevance of arsenic complexed with organic matter in Chinese ground water
Within EPFL SDC 2009-2012 Scientific Cooperation Fund

SWISSELECTRIC RESEARCH (CCEM)

Projektleiter: S.M.A. Biollaz
Methan aus Holz

Projektleiter: I. Mantzaras, P. Jansohn
Technologies for Gas Turbine Power Generation with CO_2 Mitigation

Projektleiter: J. Wochele, Ch. Ludwig
TREPGAS: Trace Elements in Product Gases

UGZ

Projektleiter: E. Weingartner, J. Brunner[1]
Entwicklung eines SMPS-Systems für den kontinuierlichen Einsatz
[1] Amt für Umwelt- und Gesundheitsschutz, Zürich

UNIVERSITIES

Projektleiter: P.P. Radi
REMPI and Photoelectron-Spectroscopy on Formaldehyde
Prof. F. Merkt, ETH Zürich

Projektleiter: P.P. Radi
DFWM and TC-RFWM Spectroscopy on Transient Molecules and Radicals
Prof. J.P. Maier, Universität Basel

Projektleiter: P.P. Radi
Detection of Weak Overtone and Combination Band of Methane
Dr. D. Kozlov, General Physics Institute, Moscow, Russia
Prof. D.A. Sadovskii, Département de physique, Université du Littoral, Dunkerque, France

VELUX STIFTUNG

Projektleiter: Ch. Ludwig
Hydrothermal methane from microalgae (the SunCHem process)

TEACHING ACTIVITIES (LECTURES)

University Level Teaching

Prof. Dr. U. Baltensperger, Prof. Dr. H. Burtscher, Dr. C. Marcolli
Aerosole II
ETH Zürich, FS 2009.

Prof. Dr. U. Baltensperger, Prof. Dr. H. Burtscher, Dr. C. Marcolli
Aerosole I
ETH Zürich, HS 2009.

Prof. Dr. U. Baltensperger
European Research Courses on Atmospheres
- Sources, sinks and global distribution of aerosols
- Direct and indirect aerosol effect on climate
- Smog chamber activities and other new directions of research
ERCA, Grenoble, France, January 12 – February 13, 2009.

Prof. Dr. K. Boulouchos[1], Dr. O. Kröcher
IC-Engines and Propulsion Systems II
ETH Zürich, HS 2009.
[1] ETH Zürich

Dr. P. Jansohn
Gasturbinen: Prozesse und Verbrennungssysteme
(Vorlesung für höhere Semester/Master in den Studiengängen Maschineningenieurwissenschaften und Energy Science & Technology)
ETH Zürich, FS 2009.

PD Dr. T. Lippert
Inorganic Thin Films: Processing, Properties and Applications
Contributions (4 lectures on the topic: *Vacuum thin film deposition techniques* and *Thin film industrial applications*) to the lecture: by L. Gauckler, J. Rupp, A. Bieberle
ETH Zürich, FS 2009.

PD Dr. T. Lippert
Mikro- und Nanostrukturen: Laseranwendungen in Industrie und Forschung
ETH Zürich, HS 2009.

Dr. P. Loutzenhiser
Thermodynamics III
ETH Zürich, HS 2009.

Prof. Dr. Ch. Ludwig
Advanced Solid Waste Treatment
Master 7th and 9th semester
EPF Lausanne, FS 2009.

Prof. Dr. Ch. Ludwig
Analyse des polluants dans l'environnement, together with Dr. Felippe de Alencastro
Bachelor 5th semester
EPF Lausanne, FS 2009.

Prof. Dr. Ch. Ludwig
Joint course with Prof. Dr. J.-L. Scartezzini, Dr. D. Robinson, Prof. Dr. A.G. Dumont, Dr. J-J. Hefti, Prof. Dr. A. Mermoud, Prof. Dr. R. Schlaepfer, Dr. M. Soutter
Quartiers urbains, infrastructures et aménagements durables
Bachelor 6th semester
EPF Lausanne, HS 2009.

PD Dr. I. Mantzaras, Dr. C. Frouzakis
Theoretical and Numerical Combustion
ETH Zürich, FS 2009.

Prof. Dr. P. Novák, Prof. Dr. A. Wokaun
Technische Elektrochemie
ETH Zürich, HS 2009.

Dr. A.S.H. Prévôt, Prof. J. Staehelin
Tropospheric Chemistry
ETH Zürich, FS 2009.

Dr. R.T.W. Siegwolf, Dr. M. Lehmann
Stabile Isotope in den Umwelt- und Geowissenschaften
University of Basel, WS 2008/2009.

Prof. Dr. A. Steinfeld, Prof. Dr. R. Abhari
Energy Systems and Power Engineering
ETH Zürich, FS 2009.

Prof. Dr. A. Steinfeld
Concentrated Solar Power and Fuels
California Institute of Technology, Pasadena, USA, HS 2009.

Dr. F. Vogel (gemeinsam mit Prof. Dr. Ph. Rudolf von Rohr)
Einführung in die Verfahrenstechnik / Vorlesung 5. Semester Maschinenbau und Verfahrenstechnik
ETH Zürich, HS 2009.

Prof. Dr. A. Wokaun, Dr. G.G. Scherer, Prof. Dr. K. Boulouchos
Renewable Energy Technologies II
ETH Zürich, FS 2009.

Prof. Dr. A. Wokaun, Dr. P. Loutzenhiser
Renewable Energies Technologies I
ETH Zürich, HS 2009.

Contributions to Courses at Universities, FHL, and Other Institutes

Prof. Dr. U. Baltensperger
Organic aerosol: Formation, Transformation, Characterization, and Source apportionment
- Italian Aerosol School, Bari, Italy, December 14-19, 2009.
- University of Stockholm, Sweden, November 21-25, 2009.

Dr. S.M.A. Biollaz
Renewable Energy Technologies I (lectures on biomass, biofuels)
ETH Zürich, HS 2009.

M. Brandenberger
Biological Gas Treatment
Master in environmental engineering, environmental sciences and engineering, SSIE,
EPF Lausanne, FS 2009.

Dr. W. Durisch
Photovoltaik - Strom aus Sonnenlicht
ABB University, Lerncenter Business Processes and Power System Management, Baden, October 23, 2009.

Dr. W. Durisch
Photovoltaik - Strom aus Sonnenlicht
Energietechnische Aus- und Weiterbildung für nichttechnische Fach- und Führungskräfte,
ABB Technikerschule, Baden, May 4, 2009.

Dr. M. Nachtegaal
“Cook and Look: Synchrotron Techniques.” Part of the Master’s Program,
“Biogeochemistry and Pollution Dynamics“
ETH Zürich

Dr. M. Nachtegaal
Practicum Summer School on Functional Materials
ETH Zürich

Dr. R.T.W. Siegwolf, Dr. M. Saurer
Stabile Isotope in der Ökologie
University of Zürich, Lecture and Practicum, January 26-30, 2009.

Dr. R.T.W. Siegwolf
Tree Physiology and Stable Isotopes
Springschool INRA Nancy, France, March 16-20, 2009.

Dr. R.T.W. Siegwolf, Dr. M. Saurer
Stabile Isotope in der Ökologie und Physiologie der Pflanzen
University of Basel, Lecture and Practicum, November 23-27, 2009.

Dr. S. Ulli-Beer
Systeme, Komplexität – und wie Menschen damit umgehen können
Einführung in Allgemeine Ökologie - Systemansätze, Interfakultäre Koordinationsstelle für Allgemeine Ökologie, Universität Bern, November 26 – Dezember 3, 2009.

Prof. Dr. A. Wokaun
Energy Situation
EMBA and Executive Diploma Programmes "Utility Technology: Module 3"
iimt, University of Fribourg, September 30, 2009.

PUBLICATIONS

Books and Reviewed Book Chapters

F.N. Büchi, M. Inaba, T.J. Schmidt, Editors
Polymer Electrolyte Fuel Cell Durability
ISBN 978-0-387-85534-9, Springer Science + Business Media, LLC (2009).

F.N. Büchi
Mathematical modeling of fuel cells
ISBN 978-0-470-23289-7, Fuel Cells: Problems and Solutions, Edited by V.S. Bagotsky, John Wiley & Sons, Inc., Chapter 15, 255-261 (2009).

F.N. Büchi
Heterogeneous cell ageing in polymer electrolyte fuel cell stacks
ISBN 978-0-387-85534-9, e-ISBN 978-0-387-85536-3, Springer Science+Business Media, LLC 2009. Polymer Electrolyte Fuel Cell Durability, Edited by F.N. Büchi, M. Inaba, T.J. Schmidt, 431-439 (2009).

S.A. Freunberger, M. Reum, F.N. Büchi
Design approaches for determining local current and membrane resistance in polymer electrolyte fuel cells (PEFCs)
ISBN 978-0-470-72311-1, Handbook of Fuel Cells – Fundamentals, Technology and Applications, Edited by W. Vielstich, H.A. Gasteiger, H. Yokokawa; John Wiley & Sons, Chichester, **6**, Chapter 41, 603-615 (2009).

L. Gubler, G.G. Scherer
Durability of radiation grafted fuel cell membranes
doi: 10.1007/978-0-387-85536-3, Polymer Electrolyte Fuel Cell Durability, Edited by F.N. Büchi, M. Inaba, T.J. Schmidt, ISBN 978-0-387-85534-9, Springer, New York, 133-155 (2009).

L. Gubler, G.G. Scherer
Radiation grafted proton conducting membranes
ISBN 978-0-470-72311-1, Handbook of Fuel Cells – Fundamentals, Technology and Applications, Edited by W. Vielstich, H.A. Gasteiger, H. Yokokawa, John Wiley & Sons, Chichester, **5**, Chapter 20, 313-321 (2009).

T. Lippert
UV laser ablation of polymers: from structuring to thin film deposition, in *Laser-Surface Interactions for New Materials Production Tailoring Structure and Properties*
Eds. A. Miotello, P.M. Ossi, Springer, Berlin, Springer Series in Material Chemistry **130**, 141 (2009).

I. Mantzaras
Catalytic combustion of syngas
ISBN: 978-1-4200-8534-1, Eds. T.C. Lieuwen and V. Yang, Taylor and Francis Publ., London, Gas synthesis combustion: fundamentals and applications, Chapter 8, 223-260 (2009).

A. Meier, A. Steinfeld
Chemische Brennstoffe aus Solarenergie
ISBN 978-3-7281-3219-2, Energie, P.R. von Rohr, P. Walde, B. Batlogg Eds., vdf Hochschulverlag AG an der ETH Zürich, 107-114 (2009).

P. Novák, D. Goers[1], M.E. Spahr[1]
Carbon materials in lithium-ion batteries
ISBN 10: 1420053078, ISBN 13: 9781420053074, Edited by F. Béguin and E. Frackowiak, CRC Press - Taylor and Francis Group, Boca Raton-New York, Carbon materials for electrochemical energy storage systems, 263-328 (2009).
[1] TIMCAL SA, Bodio

V. Prigiobbe[1], G. Costa[2], R. Baciocchi[2], M. Hänchen, M. Mazzotti[1]
The effect of CO_2 and salinity on olivine dissolution kinetics at 120 °C
Chem. Eng. Sci. **64**, 3510-3515 (2009).
[1] ETH Zürich
[2] University of Rome "Tor Vergata", Rome, Italy

I.A. Schneider, G.G. Scherer
Local transient techniques in polymer electrolyte fuel cell (PEFC) diagnostics
ISBN 978-0-470-72311-1, Handbook of Fuel Cells – Fundamentals, Technology and Applications, Edited by W. Vielstich, H.A. Gasteiger, H. Yokokawa, John Wiley & Sons, Chichester, **6**, Part 4, Chapter 45, 673-686 (2009).

A. Steinfeld
Editor-in-Chief
ASME Journal of Solar Energy Engineering **131**, Issues 1, 2, 3, 4 (2009).

S. Stucki
Perspektiven der Technologieentwicklung zur Nutzung von Energieholz
ISBN 978-3-7281-3209-3, Kapitel in O.Thees und R. Lemm, Management zukunftsfähige Waldnutzung, vdf Hochschulverlag Zürich, 715-726 (2009).

S. Ulli-Beer, M. Bosshardt, P. Dietrich, A. Wokaun
What alternative drive-train technologies and policies are needed to meet a 50% CO_2 reduction target?
ISBN: 978-0-7680-2154-7, S. Das (Ed.), *"Sustainable Mobility Applications for Engineering"*.
SAE International, Detroit, Michigan, USA (2009).

F. Vogel
Catalytic conversion of high-moisture biomass to synthetic natural gas in supercritical water
ISBN 978-3-527-32497-2, Handbook of Green Chemistry, Paul Anastas (Series Editor), **2**, Heterogeneous Catalysis, Robert Crabtree (Volume Editor), Wiley-VCH: Weinheim, chapter 12, 281-324 (2009).

C. Wieckert, M. Epstein[1], G. Olalde[2], S. Santén[3], A. Steinfeld
Zinc-air batteries - solar thermal recharge (Zn/ZnO)
ISBN: 978-0-444-52093-7, Edited by Jürgen Garche, Chris Dyer, Patrick Moseley, Zempachi Ogumi, David Rand, Bruno Scrosati, Amsterdam, Elsevier, Encyclopedia of Electrochemical Power Sources **5,** 469-486, (2009).
[1] The Weizmann Institute of Science, Rehovot, Israel
[2] PROMES-CNRS, Odeillo, France
[3] ScanArc Plasma Technologies AG, Hofors, Sweden

A. Wokaun et al.
Energy Technology
ISBN 978-3-00-027388-4, GENNESYS White Paper, A new European partnership between nanomaterials science & nanotechnology and synchrotron radiation and neutron facilities, Max-Planck-Institut für Metallforschung, Stuttgart, February, 186-205 (2009).

Peer Reviewed Papers

A.C. Aiken, D. Salcedo, M.J. Cubison, J.A. Huffmann, P.F. DeCarlo, I.M. Ulbrich, K.S. Docherty, D. Sueper, J.R. Kimmel, D.R. Worsnop, A. Trimborn, M. Northway, E.A. Stone, J.J. Schauer, R.M. Volkamer, E. Fortner, B. De Foy, J. Wang, A. Laskin, V. Shutthanandan, J. Zheng, R. Zhang, J. Gaffney, N.A. Marley, G. Paredes-Miranda, W.P. Arnott, L.T. Molina, G. Sosa, J.L. Jimenez
Mexico city aerosol analysis during MILAGRO using high resolution aerosol mass spectrometry at the urban supersite (T0) - Part 1: Fine particle composition and organic source apportionment
Atmos. Chem. Phys. **9**, 6633-6653 (2009).

E.M.C. Alayon[1], J. Singh[1], M. Nachtegaal, M. Harfouche, J.A. van Bokhoven[1]
On highly active partially oxidized platinum in carbon monoxide oxidation over supported platinum catalysts
J. Catal. **263**, 228-238 (2009).
[1] ETH Zürich

R. Bader[1], P. Haueter[1], A. Pedretti[2], A. Steinfeld
Optical design of a novel 2-stage solar trough concentrator based on pneumatic polymeric structures
ASME J. Solar Energy Eng. **131**, 031007, 1-9 (2009).
[1] ETH Zürich
[2] ALE Airlight, Biasca

M. Bahn, M. Schmitt, R. Siegwolf, A. Richter, N. Bruggemann
Does photosynthesis affect grassland soil-respired CO_2 and its carbon isotope composition on a diurnal timescale?
New Phytologist **182**, 451-460 (2009).

R. Bahreini, B. Ervens, A.M. Middlebrook, C. Warneke, J.A. deGouw, P.F. DeCarlo, J.L. Jimenez, C.A. Brock, J.A. Neuman, T.B. Ryerson, H. Stark, E. Atlas, J. Brioude, A. Fried, J. Holloway, J. Peischl, D. Richter, J. Walega, P. Weibring, A.G. Wollny, F.C. Fehsenfeld
Organic aerosol formation in urban and industrial plumes near Houston and Dallas, Texas
doi:10.1029/2008JD011493, J. Geophys. Res. **114**, D00F16 (2009).

P. Barmet, T. Kuster, A. Muhlbauer, U. Lohmann
Weekly cycle in particulate matter versus weekly cycle in precipitation over Switzerland
doi:10.1029/2008JD011192, J. Geophys. Res. **114**, D05206 (2009).

G. Battipaglia, M. Saurer, P. Cherubini, R.T.W. Siegwolf, M.F. Cotrufo
Tree rings indicate different drought resistance of a native (Abies alba Mill.) and a nonnative (Picea abies (L.) Karst.) species co-occurring at a dry site in Southern Italy
Forest Ecology and Management **257**, 820-828 (2009).

J. Becker[1], R. Flückiger, M. Reum, F.N. Büchi, F. Marone, M. Stampanoni
Determination of material properties of gas diffusion layers: Experiments and simulations using phase contrast tomographic microscopy
doi: 10.1149/1.3176876, J. Electrochem. Soc. **156**, B1175-B1181 (2009).
[1] Fraunhofer ITWM, Kaiserslautern, Germany

H. Ben youcef, L. Gubler, S. Alkan Gürsel, T. Yamaki[1], S. Sawada[1], A. Wokaun, G.G. Scherer
Crosslinker effect in ETFE based radiation grafted proton conducting membranes: II. Extended fuel cell operation and degradation analysis
doi: 10.11149/1.3082109, J. Electrochem. Soc. **156**, B532-539 (2009).
[1] Japan Atomic Energy Agency (JAEA), Japan

H. Ben youcef, L. Gubler, S. Alkan-Gürsel, D. Henkensmeier, A. Wokaun, G.G. Scherer
Novel ETFE based radiation grafted poly(styrene sulfonic acid-co-methacrylonitrile) proton conducting membranes with increased stability
doi: 10.1016/j.elecom.2009.02.047, Electrochem. Commun. **11**, 941-944 (2009).

J. Bernard, S. Delprat[1], F.N. Büchi, T.M. Guerra[1]
Fuel cell hybrid powertrain: Towards minimization of hydrogen consumption
doi: 10.1109/TVT.2009.2014684, IEEE Transaction on Vehicular Technology **58**, 3168-3176 (2009).
[1] Université de Valenciennes et du Hainaut-Cambrésis, France

I. Bilecka[1], A. Hintennach, I. Djerdj[1], P. Novák, M. Niederberger[1]
Efficient microwave-assisted synthesis of $LiFePO_4$ mesocrystals with high cycling stability
doi: 10.1039/b909545d, J. Mater. Chem. **19**, 5125-5128 (2009).
[1] ETH Zürich

D. Bleiner[1], T. Lippert
Stopping power of a buffer for laser plasma debris mitigation
J. App. Phys. **106**, 123301 (2009).
[1] ETH Zürich

A. Bodi, M. Johnson, T. Gerber, Z. Gengeliczki[1], B. Sztaray[2], T. Baer[3]
Imaging photoelectron photoion coincidence spectroscopy with velocity focusing electron optics
Rev. Sci. Instr. **80**, 034101 (2009).
[1] Eötvös Loránd University, Budapest, Hungary
[2] University of the Pacific, Stockton, California, USA
[3] University of North Carolina, USA

A. Bodi, N.S. Shuman[1],T. Baer[1]
On the ionization and dissociative photoionization of iodomethane: a definitive experimental enthalpy of formation of CH_3I
doi: 10.1039/b915400k, Phys. Chem. Chem. Phys. **11**, 11013-11021 (2009).
[1] University of North Carolina, USA

S. Brandenberger, O. Kröcher, A. Wokaun, A. Tissler, R. Althoff
The role of Brønsted-acidity in the selective catalytic reduction of NO with ammonia over Fe-ZSM-5
J. Catal. **268,** 297-306 (2009).

N. Bukowiecki, P. Lienemann, M. Hill, R. Figi, A. Richard, M. Furger, K. Rickers, G. Falkenberg, Y.J. Zhao, S.S. Cliff, A.S.H. Prévôt, U. Baltensperger, B. Buchmann, R. Gehrig
Real-world emission factors for antimony and other brake wear related trace elements: Size-segregated values for light and heavy duty vehicles
Environ. Sci. Technol. **43**, 8072-8078 (2009).

N. Bukowiecki, R. Richter, M. Furger, E. Weingartner, M. Aguirre, T. Huthwelker, P. Lienemann, R. Gehrig, U. Baltensperger
Deposition uniformity and particle size distribution of ambient aerosol collected with a rotating drum impactor
doi:10.1080/02786820903002431, Aerosol Sci. Technol. **43**, 891-901 (2009).

S. Canulescu[1], E. Papadopoulou[2], D. Anglos[2], T. Lippert, C.W. Schneider, A. Wokaun
Mechanisms of the laser plume expansion during laser ablation of $LiMn_2O_4$
J. Appl. Phys. **105**, 063107-11 (2009).
[1] EMPA Thun
[2] Institute of Electronic Structure and Laser, Greece

M. Casapu, O. Kröcher, M. Elsener
Screening of doped MnO_x-CeO_2 catalysts for low-temperature NO-SCR
Appl. Catal. B **88**, 413-419 (2009).

S.Y. Chew, S.H. Ng, J. Wang[1], P. Novák, F. Krumeich[2], S.L. Chou[1], J. Chen[1], H.K. Liu[1]
Flexible free-standing carbon nanotube films for model lithium-ion batteries
doi: 10.1016j.carbon.2009.06.045, Carbon **47**, 2976-2983 (2009).
[1] University of Wollongong, Australia
[2] ETH Zürich

S.Y. Chew, T.J. Patey, O. Waser[1], S.H. Ng, R. Büchel[1], A. Tricoli[1], F. Krumeich[1], J. Wang[2], H.K. Liu[2], S.E. Pratsinis[1], P. Novák
Thin nanostructured $LiMn_2O_4$ films by flame spray deposition and in situ annealing method
doi: 10.1016./j.powsour.2008.12.085, J. Power Sources **189**, 449-453 (2009).
[1] ETH Zürich
[2] University of Wollongong, Australia

P. Coray, W. Lipinski[1], A. Steinfeld
Experimental and numerical determination of thermal radiative properties of ZnO particulate media
ASME J. Heat Transfer **132**, 012701 (2009).
[1] ETH Zürich

J.D. Crounse, P.F. DeCarlo, D.R. Blake, L.K. Emmons, T.L. Campos, E.C. Apel, A.D. Clarke, A.J. Weinheimer, D.C. McCabe, R.J. Yokelson, J.L. Jimenez, P.O. Wennberg
Biomass burning and urban air pollution over the Central Mexican Plateau
Atmos. Chem. Phys. **9**, 4929-4944 (2009).

I. Czekaj, F. Loviat, J. Wambach, A. Wokaun
Nickel deposition on γ-Al_2O_3: Modelling metal particle behaviour at the support
doi: 10.2533/chimia.2009.193, Chimia **63**, 193-196 (2009).

I. Czekaj, J. Wambach, O. Kröcher
Modelling catalyst surfaces using DFT cluster calculations
Int. J. Mol. Sci. **10**, 4310-4329 (2009).

I. Czekaj, O. Kröcher
Decomposition of urea in the SCR process: Combination of DFT calculations and experimental results on the catalytic hydrolysis of isocyanic acid on TiO_2 and Al_2O_3
Top. Catal. **52**, 1740-1745 (2009).

L. Dombrovsky[1], L. Schunk, W. Lipiński[1], A. Steinfeld
An ablation model for the thermal decomposition of porous zinc oxide layer heated by concentrated solar radiation
Int. J. Heat Mass Transfer **52**, 2444-2452 (2009).
[1] ETH Zürich

J. Dommen, H. Hellen, M. Saurer, M. Jäggi, R. Siegwolf, A. Metzger, J. Duplissy, M. Fierz, U. Baltensperger
Determination of the aerosol yield of isoprene in the presence of an organic seed with carbon isotope analysis
Environ. Sci. Technol. **43**, 6697-6702 (2009).

F. Drewnick, S.S. Hings, M.R. Alfarra, A.S.H. Prévôt, S. Borrmann
Aerosol quantification with the aerodyne aerosol mass spectrometer: detection limits and ionizer background effects
Atmos. Meas. Tech. **2**, 33-46 (2009).

E.J. Dunlea, P.F. DeCarlo, A.C. Aiken, J.R. Kimmel, R.E. Peltier, R.J. Weber, J. Tomlinson, D.R. Collins, Y. Shinozuka, C.S. McNaughton, S.G. Howell, A.D. Clarke, L.K. Emmons, E.C. Apel, G.G. Pfister, A. van Donkelaar, R.V. Martin, D.B. Millet, C.L. Heald, J.L. Jimenez
Evolution of Asian aerosols during transpacific transport in INTEX-B
Atmos. Chem. Phys. **9**, 7257-7287 (2009).

J. Duplissy, M. Gysel, S. Sjögren, N. Meyer, N. Good, L. Kammermann, V. Michaud, R. Weigel, S. Martins dos Santos, C. Gruening, P. Villani, P. Laj, K. Sellegri, A. Metzger, G.B. McFiggans, G. Wehrle, R. Richter, J. Dommen, Z. Ristovski, U. Baltensperger, E. Weingartner
Intercomparison study of six HTDMAs: results and recommendations
Atmos. Meas. Tech. **2**, 363-378 (2009).

F. Ernst[1], A. Steinfeld, S. Pratsinis[1]
Hydrolysis rate of submicron Zn particles for solar H_2 synthesis
Int. J. Hydrogen Energy **34**, 1166-1175 (2009).
[1] ETH Zürich

A. Escrig, E. Monfort, I. Celades, X. Querol, F. Amato, M.C. Minguillón, P.K. Hopke
Application of optimally scaled target factor analysis for assessing source contribution of ambient PM10
J. Air Waste Manage. Assoc. **59**, 1296-1307 (2009).

R. Fardel[1], L. Urech, Th. Lippert, C. Phipps[2], J.M. Fitz-Gerald[3], A. Wokaun
Laser ablation of energetic polymer solutions: effect of viscosity and fluence on the splashing behavior
Appl. Phys. A **94**, 657-665 (2009).
[1] EMPA Dübendorf / PSI
[2] Photonic Associates, Santa Fe, USA
[3] University of Virginia, USA

R. Fardel[1], M. Nagel[2], F. Nüesch[2], T. Lippert, A. Wokaun
Shadowgraphy investigation of laser-induced forward transfer: Front side and back side ablation of the triazene polymer sacrificial layer
Appl. Surf. Sci. **255**, 5430-5434 (2009).
[1] EMPA Dübendorf and PSI
[2] EMPA Dübendorf

R. Fardel[1], M. Nagel[2], F. Nüesch[2], T. Lippert, A. Wokaun
Energy balance in a laser-induced forward transfer process studied by shadography
J. Phys. Chem. C **113**, 11628-11633 (2009).
[1] EMPA Dübendorf and PSI
[2] EMPA Dübendorf

J. Fast, A.C. Aiken, J. Allan, L. Alexander, T. Campos, M.R. Canagaratna, E. Chapman, P.F. DeCarlo, B. De Foy, J. Gaffney, J. de Gouw, J.C. Doran, L. Emmons, A. Hodzic, S.C. Herndon, G. Huey, J.T. Jayne, J.L. Jimenez, L. Kleinman, W. Kuster, N. Marley, L. Russell, C. Ochoa, T.B. Onasch, M. Pekour, C. Song, I.M. Ulbrich, C. Warneke, D. Welsh-Bon, C. Wiedinmeyer, D.R. Worsnop, X.-Y. Yu, R. Zaveri
Evaluating simulated primary anthropogenic and biomass burning organic aerosols during MILAGRO: implications for assessing treatments of secondary organic aerosols
Atmos. Chem. Phys. **9**, 6191-6215 (2009).

J.P. Ferrio, M. Cuntz, C. Offermann, R. Siegwolf, M. Saurer, A. Gessler
Effect of water availability on leaf water isotopic enrichment in beech seedlings shows limitations of current fractionation models
Plant Cell and Environment **32**, 1285-1296 (2009).

M. Fierz, S. Weimer, H. Burtscher
Design and performance of an optimized electrical diffusion battery
J. Aerosol Sci. **40**, 152-163 (2009).

R. Fisseha, M. Saurer, M. Jäggi, R.T.W. Siegwolf, J. Dommen, S. Szidat, V. Samburova, U. Baltensperger
Determination of primary and secondary sources of organic acids and carbonaceous aerosols using stable carbon isotopes
Atmos. Environ. **43**, 431-437 (2009).

B. Flury[1], J. Frommer[2], U. Eggenberger[1], U. Mäder[1], M. Nachtegaal, R. Kretzschmar[2]
Assessment of long-term performance and chromate reduction mechanisms in a field scale permeable reactive barrier
Environ. Sci. Technol. **43**, 6786-6792 (2009).
[1] Universität Bern
[2] ETH Zürich

H.J.H. Franssen, T. Kuster, P. Barmet, U. Lohmann
Comment on "Winter 'weekend effect' in southern Europe and its connection with periodicities in atmospheric dynamics" by A. Sanchez-Lorenzo et al.
Geophys. Res. Lett. **36** (2009).

G. Frei, E.H. Lehmann, D. Mannes, P. Boillat
The neutron micro-tomography setup at PSI and its use for research purposes and engineering applications
doi: 10.1016/j.nima.2009.01.135, Nucl. Instrum. Methods Phys. Res., Sect. A **605**, 111-114 (2009).

B. Friedman, H. Herich, L. Kammermann, D.S. Gross, A. Arneth, T. Holst, U. Lohmann, D.J. Cziczo
Sub-arctic atmospheric aerosol composition 1: Ambient aerosol characterization
doi:10.1029/2009JD011772, Geophys. Res. Atmos. **114**, D13203 (2009).

J. Frommer[1], M. Nachtegaal, I. Czekaj, T.-C. Weng[2], R. Kretzschmar[1]
X-ray absorption and emission spectroscopy of Cr^{III} (hydr)oxides: Analysis of the K pre-edge region
J. Phys. Chem. A **113**, 12171-12178 (2009).
[1] ETH Zürich
[2] ESRF, Grenoble, France

S. Gaan[1], P. Rupper[1], V. Salimova[1], M. Heuberger[1], S. Rabe, F. Vogel
Thermal decomposition and burning behavior of cellulose treated with ethyl ester phosphoramidates: Effect of alkyl substituent on nitrogen atom
Polym. Degrad. Stab. **94** 1122-1134 (2009).
[1] EMPA St. Gallen

M.E. Galvez[1], A. Frei, F. Meier[2], A. Steinfeld
Production of AlN by carbothermal and methanothermal reduction of Al_2O_3 in a N_2 flow using concentrated thermal radiation
Ind. Eng. Chem. Res. **48**, 528-533 (2009).
[1] Instituto de Carboquímica, Zaragoza, Spain
[2] ETH Zürich

N. Gentile, R.T.W. Siegwolf, O. Delemont
Study of isotopic variations in black powder: reflections on the use of stable isotopes in forensic science for source inference
Rapid Commun. Mass Spectrom. **23**, 2559-2567 (2009).

S. Gilardoni, S. Liu, S. Takahama, L.M. Russell, J.D. Allan, R. Steinbrecher, J.L. Jimenez, P.F. DeCarlo, E.J. Dunlea, D. Baumgardner
Characterization of organic ambient aerosol during MIRAGE 2006 on three platforms
Atmos. Chem. Phys. **9**, 5417-5432 (2009).

J.L. Gómez Cámer[1], J. Morales[1], L. Sánchez[1], P. Ruch, S.H. Ng, R. Kötz, P. Novák
Nanosized Si/cellulose fiber/carbon composites as high capacity anodes for lithium-ion batteries: A galvanostatic and dilatometric study
doi: 10.1016/j.electacta.2009.06.085, Electrochim. Acta **54**, 6713-6717 (2009).
[1] Universidad de Córdoba, Spain

Ph. Graf[1], A. Mantion[1,4], A. Foelske, A. Shkilnyy[2,3], A. Masic[3], A.F. Thünemann[4], and A. Taubert[1,2,3]
Peptide-coated silver nanoparticles: Synthesis, surface chemistry, and pHtriggered, reversible assembly into particle assemblies
doi: 10.1002/chem.200802329, Chem. Eur. J. **15**, 5831-5844 (2009).
[1] University of Basel
[2] University of Potsdam, Golm Germany
[3] Max-Planck-Institute of Colloids and Interfaces, Golm Germany
[4] BAM Federal Institute for Materials Research and Testing, Berlin Germany

J.-D. Grunwaldt[1], M. Beier[1], B. Kimmerle[2], A. Baiker[2], M. Nachtegaal, B. Griesebock[3], D. Lützenkirchen-Hecht[3], R. Frahm[3]
Dynamic structural changes during the ignition and extinction of the partial oxidation of methane studied by QEXAFS
Phys. Chem. Chem. Phys. **11**, 8779-8789 (2009).
[1] DTU Copenhagen, Denmark
[2] ETH Zürich
[3] Wuppertal University, Germany

L. Gubler, M. Slaski, F. Wallasch, A. Wokaun, G.G. Scherer
Radiation grafted fuel cell membranes based on co-grafting of α-methylstyrene and methacrylonitrile into a fluoropolymer base film
doi: 10.1016/j.memsci.2009.04.031, J. Membr. Sci. **339**, 68-77 (2009).

M.R. Guerrieri, R.T.W. Siegwolf, M. Saurer, M. Jaggi, P. Cherubini, F. Ripullone, M. Borghetti
Impact of different nitrogen emission sources on tree physiology as assessed by a triple stable isotope approach
Atmos. Environ. **43**, 410-418 (2009).

M. Gysel, G.B. McFiggans, H. Coe
Inversion of tandem differential mobility analyser (TDMA) measurements
J. Aerosol Sci. **40**, 134-151 (2009).

A.G. Haiduc[1], M. Brandenberger, S. Suquet, F. Vogel, R. Bernier-Latmani, Ch. Ludwig
SunCHem: an integrated process for the hydrothermal production of methane from microalgae and CO_2 mitigation
J. Appl. Phycol. **21**, 529-541 (2009).
[1] EPF Lausanne

M. Hallquist, J.C. Wenger, U. Baltensperger, Y. Rudich, D. Simpson, M. Claeys, J. Dommen, N.M. Donahue, C. George, A.H. Goldstein, J.F. Hamilton, H. Herrmann, T. Hoffmann, Y. Iinuma, M. Jang, M. Jenkin, J.L. Jimenez, A. Kiendler-Scharr, W. Maenhaut, G. McFiggans, T.F. Mentel, A. Monod, A.S.H. Prévôt, J.H. Seinfeld, J.D. Surratt, R. Szmigielski, J. Wildt
The formation, properties and impact of secondary organic aerosol: current and emerging issues
Atmos. Chem. Phys. **9**, 5155-5236 (2009).

M. Halmann[1], A. Steinfeld
Hydrogen production and CO_2 fixation by flue-gas treatment using methane tri-reforming or coke/coal gasification combined with lime carbonation
Int. J. Hydrogen Energy **34**, 8061-66 (2009).
[1] The Weizmann Institute of Science, Rehovot, Israel

S. Haussener[1], D. Hirsch[1], C. Perkins[2], A. Weimer[2], A. Lewandowski[3], A. Steinfeld
Modeling of a multitube high-temperature solar thermochemical reactor for hydrogen production
ASME J. Solar Energy Eng. **131**, 024503, 1-5 (2009).
[1] ETH Zürich
[2] University of Colorado, Boulder, USA
[3] NREL, Golden, CO, USA

S. Haussener[1], W. Lipiński[1], J. Petrasch[1], P. Wyss[1], A. Steinfeld
Tomographic characterization of a semitransparent-particle packed bed and determination of its thermal radiative properties
ASME J. Heat Transfer **131**, 072701 (2009).
[1] ETH Zürich

H. Herich, L. Kammermann, B. Friedman, D.S. Gross, E. Weingartner, U. Lohmann, P. Spichtinger, M. Gysel, U. Baltensperger, D.J. Cziczo
Subarctic atmospheric aerosol composition 2: hygroscopic growth properties
doi:10.1029/2008JD011574, J. Geophys. Res. **114**, D13204 (2009).

H. Herich, T. Tritscher, A. Wiacek, M. Gysel, E. Weingartner, U. Lohmann, U. Baltensperger, D.J. Cziczo
Water uptake of clay and desert dust aerosol particles at sub- and supersaturated water vapor conditions
Phys. Chem. Chem. Phys. **11**, 7804-7809 (2009).

A. Hintennach, P. Novák
Influence of surfactants and viscosity in the preparation process of battery electrodes containing nanoparticles
doi: 10.1039/b911674e, Phys. Chem. Chem. Phys. **11**, 9484-9488 (2009).

W. Hubschmid
Molecular relaxations in mixtures of O_2 with CO_2 observed on laser-induced gratings
Appl. Phys. B **94**, 345-353 (2009).

J.A. Huffmann, K.S. Docherty, A.C. Aiken, M.J. Cubison, I.M. Ulbrich, P.F. DeCarlo, D. Sueper, J.T. Jayne, D.R. Worsnop, P.J. Ziemann, J.L. Jimenez
Chemically-resolved aerosol volatility measurements from two megacity field studies
Atmos. Chem. Phys. **9**, 7161-7182 (2009).

J.A. Huffmann, K.S. Docherty, C. Mohr, M.J. Cubison, I.M. Ulbrich, P.J. Ziemann, T. Onasch, J.L. Jimenez
Chemically-resolved volatility measurements of organic aerosol from different sources
Environ. Sci. Technol. **43**, 5351-5357 (2009).

J.S. Hummelshoj, D. Landis, I. Czekaj, J.K. Norskov, T. Vegge
DFT-based screening of novel alkali-transition metal borohydrides- a computational materials design project
J. Chem. Phys. **131**, 014101/1-9 (2009).

I.S.A. Isaksen, C. Granier, G. Myhre, T.K. Berntsen, S.B. Dalsören, M. Gauss, Z. Klimont, R. Benestad, P. Bousquet, W. Collins, T. Cox, V. Eyring, D. Fowler, S. Fuzzi, P. Jöckel, P. Laj, U. Lohmann, M. Maione, P. Monks, A.S.H. Prévôt, F. Raes, A. Richter, B. Bognerud, M. Schulz, D. Shindell, D.S. Stevenson, T. Storelvmo, W.-C. Wang, M. van Weele, M. Wild, D. Wuebbles
Atmospheric composition change: Climate-chemistry interactions
Atmos. Environ. **43**, 5138-5192 (2009).

K. Jäger[1], W. Lipiński[1], H. Katzgraber[1], A. Steinfeld
Determination of thermal radiative properties of packed-bed media containing a mixture of polydispersed particles
Int. J. Therm. Sci. **48**, 1510–1516 (2009).
[1] ETH Zürich

T.M. Jenk, S. Szidat, D. Bolius, M. Sigl, H.W. Gäggeler, L. Wacker, M. Ruff, C. Barbante, C.F. Boutron, M. Schwikowski
A novel radiocarbon dating technique applied to an ice core from the Alps indicating late Pleistocene ages
doi:10.1029/2009JD011860, J. Geophys. Res. **114**, D14305 (2009).

J.L. Jimenez, M.R. Canagaratna, N.M. Donahue, A.S.H. Prévôt, Q. Zhang, J.H. Kroll, P.F. DeCarlo, J.D. Allan, H. Coe, N.L. Ng, A.C. Aiken, K.D. Docherty, I.M. Ulbrich, A.P. Grieshop, A.L. Robinson, J. Duplissy, J.D. Smith, K.R. Wilson, V.A. Lanz, C. Hueglin, Y.L. Sun, J. Tian, A. Laaksonen, T. Raatikainen, J. Rautiainen, P. Vaattovaara, M. Ehn, M. Kulmala, J.M. Tomlinson, D.R. Collins, M.J. Cubison, E.J. Dunela, J.A. Huffman, T.B. Onasch, M.R. Alfarra, P.I. Williams, K. Bower, Y. Kondo, J. Schneider, F. Drewnick, S. Borrmann, S. Weimer, K. Demerjian, D. Salcedo, L. Cottrell, R. Griffin, A. Takami, T. Miyoshi, S. Hatakeyama, A. Shimono, J.Y. Sun, Y.M. Zhang, K. Dzepina, J.R. Kimmel, D. Sueper, J.T. Jayne, S.C. Herndon, A.M. Trimborn, L.R. Williams, E.C. Wood, C.E. Kolb, U. Baltensperger, D.R. Worsnop
Evolution of organic aerosols in the atmosphere
Science **326**, 1525-1529 (2009).

M. Johnson, A. Bodi, L. Schulz, T. Gerber
Vacuum ultraviolet beamline at the Swiss Light Source for chemical dynamics studies
Nucl. Instrum. Methods Phys. Res. Sect. A **610**, 597-603 (2009).

Z. Juranyi, M. Gysel, J. Duplissy, E. Weingartner, T. Tritscher, J. Dommen, S. Henning, M. Ziese, A. Kiselev, F. Stratmann, I. George, U. Baltensperger
Influence of gas-to-particle partitioning on the hygroscopic and droplet activation behaviour of α-pinene secondary organic aerosol
Phys. Chem. Chem. Phys. **11**, 8091-8097 (2009).

K. Kaur[1], R. Fardel[2], T.C. May-Smith[1], M. Nagel[3], D.P. Banks[1], C. Grivas[1], T. Lippert, R.W. Eason[1]
Shadowgraphic studies of triazene assisted laser-induced forward transfer of ceramic thin films
J. Appl. Phys. **105**, 113119 (8pp) (2009).
[1] Optoelectronics Research Centre, UK
[2] PSI / EMPA Dübendorf
[3] EMPA Dübendorf

E. Kleimenov[1], A. Bergamaschi, J. van Bokhoven[1], M. Janousch, B. Schmitt, M. Nachtegaal
High-resolution hard-X-ray fluorescence spectrometer
J. Phys.: Conf. Ser. **190**, 012035 (2009).
[1] ETH Zürich

J. Kopyscinski, T.J. Schildhauer, S.M.A. Biollaz
Employing catalyst fluidization to enable carbon management in the SNG-production from biomass
Chem. Eng. Technol. **32**, 343–347 (2009).

A. Kress, M. Saurer, U. Buntgen, K.S. Treydte, H. Bugmann, R.T.W. Siegwolf
Summer temperature dependency of larch budmoth outbreaks revealed by Alpine tree-ring isotope chronologies
Oecologia **160**, 353-365 (2009).

A. Kress, G.H.F. Young, M. Saurer, N.J. Loader, R.T.W. Siegwolf, D. McCarroll
Stable isotope coherence in the earlywood and latewood of tree-line conifers
Chem. Geol. **268**, 52-57 (2009).

O. Kröcher, M. Elsener, E. Jacob
A model gas study of ammonium formate, methanamide and guanidinium formate as alternative ammonia precursor compounds for the selective catalytic reduction of nitrogen oxides in diesel exhaust gas
Appl. Catal. B **88**, 66-82 (2009).

O. Kröcher, M. Elsener
Materials for thermohydrolysis of urea in a fluidized bed
Chem. Eng. J. **152**, 167-176 (2009).

O. Kröcher, M. Elsener
Hydrolysis and oxidation of gaseous HCN over heterogeneous catalysts
Appl. Catal. B **92**, 75-89 (2009).

O. Kröcher, M. Widmer, M. Elsener, D. Rothe
Adsorption and desorption of SO_x on Diesel oxidation catalysts
doi:10.1021/ie900882p, Ind. Eng. Chem. Res. **48**, 9847-9857 (2009).

O. Kröcher, M. Elsener, M. Votsmeier
Determination of effective diffusion coefficients through the walls of coated diesel particulate filters
doi:10.1021/ie901269v, Ind. Eng. Chem. Res. **48,** 10746-10750 (2009).

M. Kulmala, A. Asmi, H.K. Lappalainen, K.S. Carslaw, U. Pöschl, U. Baltensperger, Ø. Hov, J.-L. Brenguier, S.N. Pandis, M.C. Facchini, H.-C. Hansson, A. Wiedensohler, C.D. O'Dowd
Introduction: European integrated project on aerosol cloud climate and air quality interactions (EUCAARI) - integrating aerosol research from nano to global scales
Atmos. Chem. Phys. **9**, 2825-2841 (2009).

V.N. Kurdyumov[1], G. Pizza, C. Frouzakis[2], I. Mantzaras
Dynamics of premixed flames in a narrow channel with a step-wise wall temperature
Combust. Flame **156**, 2190-2200 (2009).
[1] CIEMAT, Spain
[2] ETH Zürich

P. Laj, J. Klausen, M. Bilde, C. Plass-Dülmer, G. Pappalardo, C. Clerbaux, U. Baltensperger, J. Hjorth, D. Simpson, S. Reimann, P.-F. Coheur, A. Richter, M. De Mazière, Y. Rudich, G. McFiggans, K. Torseth, A. Wiedensohler, S. Morin, M. Schulz, J.D. Allan, J.-L. Attié, I. Barnes, W. Birmili, J.P. Cammas, J. Dommen, H.-P. Dorn, D. Fowler, S. Fuzzi, M. Glasius, C. Granier, M. Hermann, I.S.A. Isaksen, S. Kinne, I. Koren, F. Madonna, M. Maione, A. Massling, O. Moehler, L. Mona, P.S. Monks, D. Müller, T. Müller, J. Orphal, V.-H. Peuch, F. Stratmann, D. Tanré, G. Tyndall, A. Abo Riziq, M. Van Roozendael, P. Villani, B. Wehner, H. Wex, A.A. Zardini
Measuring atmospheric composition change
Atmos. Environ. **43**, 5351-5414 (2009).

F. La Mantia, F. Rosciano, N. Tran, P. Novák
Quantification of oxygen loss from $Li_{1+x}(Ni_{1/3}Mn_{1/3}Co_{1/3})_{1-x}O_2$ at high potentials by differential electrochemical mass spectrometry
doi: 10.1149/1.3205495, J. Electrochem. Soc. **156**, A823-A827 (2009).

V.A. Lanz, S. Henne, J. Staehelin, C. Hueglin, M.K. Vollmer, M. Steinbacher, B. Buchmann, S. Reimann
Statistical analysis of anthropogenic non-methane VOC variability at a European background location (Jungfraujoch, Switzerland)
Atmos. Chem. Phys. **9**, 3445-3459 (2009).

E.H. Lehmann, P. Boillat, G.G. Scherer, G. Frei
Fuel cell studies with neutrons at the PSI's neutron facilities
doi: 10.1016/j.nima.2009.01.143, Nucl. Instrum. Methods Phy. Res., Sect. A **605**, 123-126 (2009).

T. Lippert, M. Nagel[1], R. Fardel[2], F.A. Nüesch[1]
Light emitting polymer pixels deposited by laser-induced forward transfer
The Laser User **56**, 17-19 (2009).
[1] EMPA Dübendorf
[2] EMPA Dübendorf / PSI

P.G. Loutzenhiser, M.E. Galvez[1], I. Hischier[2], A. Stamatiou, A. Frei, A. Steinfeld
CO_2 splitting via two-step solar thermochemical cycles with Zn/ZnO and FeO/Fe_3O_4 redox reactions II: Kinetic analysis
Energy Fuels **23**, 2832–2839 (2009).
[1] Instituto de Carboquímica, Zaragoza, Spain
[2] ETH Zürich

F. Loviat, I. Czekaj, J. Wambach, A. Wokaun
Nickel deposition on γ-Al_2O_3 model catalysts: An experimental and theoretical investigation
doi: 10.1016/j.susc.2009.04.032, Surf. Sci. **603**, 2210–2217 (2009).

J.S. Luterbacher[1], M. Fröling[2], F. Vogel, F. Maréchal[1], J.W. Tester[3]
Hydrothermal gasification of waste biomass: Process design and life cycle assessment
Environ. Sci. Technol. **43,** 1578-1583 (2009).
[1] EPF Lausanne
[2] Chalmers University, Sweden
[3] MIT, USA

G. Maag[1], W. Lipinski[1], A. Steinfeld
Particle-gas reacting flow under concentrated solar irradiation
Int. J. Heat Mass Transfer **52**, 4997–5004 (2009).
[1] ETH Zürich

G. Maag[1], G. Zanganeh[1], A. Steinfeld
Solar thermal cracking of methane in a particle-flow reactor for the co-production of hydrogen and carbon
Int. J. Hydrogen Energy **34**, 7676–7685 (2009).
[1] ETH Zürich

W. Märkle, N. Tran, D. Goers[1], M.E. Spahr[1], P. Novák
The influence of electrolyte and graphite type on the PF_6^- intercalation behavior at high potentials
doi: 10.1016/j.carbon.2009.05.029, Carbon **47**, 2727-2732 (2009).
[1] TIMCAL SA, Bodio

I. Marozau, A. Shkabko[1], G. Dinescu[2], M. Döbeli[3], T. Lippert, D. Logvinovich[1], M. Mallepell, C.W. Schneider, A. Weidenkaff[1], A. Wokaun
Pulsed laser deposition and characterisation of nitrogen-substituted $SrTiO_3$ thin films
Appl. Surf. Sci. **255**, 5252-5256 (2009).
[1] EMPA Dübendorf
[2] National Institute for Lasers, Plasma and Radiation Physics, Romania
[3] PSI / ETH Zürich

I. Marozau, A. Shkabko[1], M. Döbeli[2], T. Lippert, D. Logvinovich[1], M. Mallepell[2], C.W. Schneider, A. Weidenkaff[1], A. Wokaun
Optical properties of nitrogen-substituted strontium titanate thin films prepared by pulsed laser deposition
Materials **2**, 1388-1401 (2009).
[1] EMPA Dübendorf
[2] PSI / ETH Zürich

C.S. McNaughton, A.D. Clarke, V. Kapustin, Y. Shinozuka, S.G. Howell, B.E. Anderson, E. Winstead, J. Dibb, E. Scheuer, R.C. Cohen, P. Woolridge, A. Perring, L.G. Huey, S. Kim, J.L. Jimenez, E.J. Dunlea, P.F. DeCarlo, P.O. Wennberg, J.D. Crounse, A.J. Weinheimer, F. Flocke
Observations of heterogeneous reactions between Asian pollution and mineral dust over the Eastern North Pacific during INTEX-B
Atmos. Chem. Phys. **9**, 8283-8308 (2009).

T. Melchior[1], N. Piatkowski[1], A. Steinfeld
H_2 production by steam-quenching of Zn vapor in a hot-wall aerosol flow reactor
Chem. Eng. Sci. **64**, 1095-1101 (2009).
[1] ETH Zürich

T. Melchior[1], C. Perkins[2], P. Lichty[2], A.W. Weimer[2], A. Steinfeld
Solar-driven biochar gasification in a particle-flow reactor
Chem. Eng. Process. **48**, 1279-1287 (2009).
[1] ETH Zürich
[2] University of Colorado, Boulder, USA

N.K. Meyer, J. Duplissy, M. Gysel, A. Metzger, J. Dommen, E. Weingartner, M.R. Alfarra, A.S.H. Prévôt, C. Fletcher, N. Good, G. McFiggans, A.M. Jonsson, M. Hallquist, U. Baltensperger, Z.D. Ristovski
Analysis of the hygroscopic and volatile properties of ammonium sulphate seeded and unseeded SOA particles
Atmos. Chem. Phys. **9**, 721-732 (2009).

M.C. Minguillon, E. Monfort, X. Querol, A. Alastuey, I. Celades, J.V. Miro
Effect of ceramic industrial particulate emission control on key components of ambient PM10
J. Environ. Manag. **90**, 2558-2567 (2009).

C. Mohr, J.A. Huffmann, M.J. Cubison, A.C. Aiken, K.S. Docherty, J.R. Kimmel, I.M. Ulbrich, M. Hannigan, J.L. Jimenez
Characterization of primary organic aerosol emissions from meat cooking, trash burning, and motor vehicles with high-resolution aerosol mass spectrometry and comparison with ambient and chamber observations
Environ. Sci. Technol. **43**, 2443-2449 (2009).

P.S. Monks, C. Granier, S. Fuzzi, A. Stohl, M.L. Williams, H. Akimoto, M. Amann, A. Baklanov, U. Baltensperger, I. Bey, N. Blake, R.S. Blake, K. Carslaw, O.R. Cooper, F. Dentener, D. Fowler, E. Fragkou, G.J. Frost, S. Generoso, P. Ginoux, V. Grewe, A. Guenther, H.C. Hansson, S. Henne, J. Hjorth, A. Hofzumahaus, H. Huntrieser, I.S.A. Isaksen, M.E. Jenkin, J. Kaiser, M. Kanakidou, Z. Klimont, M. Kulmala, P. Laj, M.G. Lawrence, J.D. Lee, C. Liousse, M. Maione, G. McFiggans, A. Metzger, A. Mieville, N. Moussiopoulos, J.J. Orlando, C.D. O'Dowd, P.I. Palmer, D.D. Parrish, A. Petzold, U. Platt, U. Pöschl, A.S.H. Prévôt, C.E. Reeves, S. Reimann, Y. Rudich, K. Sellegri, R. Steinbrecher, D. Simpson, H. ten Brink, H. Theloke, G.R. van der Werf, R. Vautard, V. Vestreng, C. Vlachoskostas, R. von Glasow
Atmospheric composition change - global and regional air quality
Atmos. Environ. **43**, 5268-5350 (2009).

F.P. Nagel, T.J. Schildhauer, S.M.A. Biollaz
Biomass integrated gasification fuel cell systems – Part 1: Definition of systems and technical analysis
Int. J. Hydrogen Energy **34**, 6809–6825 (2009).

F.P. Nagel, T.J. Schildhauer, N. McCaughey[1], S.M.A. Biollaz
Biomass integrated gasification fuel cell systems – Part 2: Economic analysis
Int. J. Hydrogen Energy **34**, 6826–6844 (2009).
[1] Monash University, Australia

F.P. Nagel, T.J. Schildhauer, J. Sfeir, A. Schuler, S.M.A. Biollaz
The impact of sulfur on the performance of a SOFC system operated with hydrocarboneous fuel gas
J. Power Sources **189**, 1127-1131 (2009).

S.-H. Ng, T.J. Patey, R. Büchel[1], F. Krumeich[1], J.-Z. Wang[2], H.-K. Liu[2], S.E. Pratsinis[1], P. Novák
Flame spray-pyrolyzed vanadium oxide nanoparticles for lithium battery cathodes
doi: 10.1039/b821389p, Phys. Chem. Chem. Phys. **11**, 3748-3755 (2009).
[1] ETH Zürich
[2] University of Wollongong, Australia

S.H. Ng, C. Vix-Guterl[1], Ph. Bernardo, N. Tran, J. Ufheil, H. Buqa, J. Dentzer[1], R. Gadiou[1], M.E. Spahr[2], D. Goers[2], P. Novák
Correlations between surface properties of graphite and the first cycle specific charge loss in lithium-ion batteries
doi: 10.1016/j.carbon.2008.11.008, Carbon **47**, 705-712 (2009).
[1] Institute for Material Science of Mulhouse, France
[2] TIMCAL SA, Bodio

S.H. Ng, F. La Mantia, P. Novák
A multiple working electrode for electrochemical cells: A tool for current density distribution studies
doi: 10.1002/annir.200803981, Angew. Chem. Int. Ed. **48**, 528-532 (2009); Angew. Chem. **121**, 536-540 (2009).

V. Nikulshina[1], A. Steinfeld
CO_2 capture from air via CaO-carbonation using a solar-driven fluidized bed reactor – Effect of temperature and water vapor concentration
Chem. Eng. J. **155**, 867-873 (2009).
[1] ETH Zürich

V. Nikulshina[1], C. Gebald[1], A. Steinfeld
CO_2 capture from atmospheric air via consecutive CaO-carbonation and $CaCO_3$-calcination cycles in a fluidized-bed solar reactor
Chem. Eng. J. **146**, 244–248 (2009).
[1] ETH Zürich

K. Pangarkar[1], T.J. Schildhauer, J.R. van Ommen[1], J. Nijenhuis1, J.A. Moulijn[1] and F. Kapteijn[1]
Experimental and numerical comparison of structured packings with a randomly packed bed reactor for Fischer–Tropsch synthesis
Catal. Today **147**, 2-9 (2009).
[1] TU Delft, The Netherlands

T.J. Patey, R. Büchel, M. Nakayama[1], P. Novák
Electrochemistry of $LiMn_2O_4$ nanoparticles made by flame spray pyrolysis
doi: 10.1039/b821572n, Phys. Chem. Chem. Phys. **11**, 3756-3761 (2009).
[1] Tokyo Institute of Technology, Japan

T.J. Patey, A. Hintennach, F. La Mantia, P. Novák
Electrode engineering of nanoparticles for lithium-ion batteries - role of dispersion technique
doi: 10.1016/j.jpowsour.2008.09.091, J. Power Sources **189**, 590-593 (2009).

T.J. Patey, R. Büchel[1], S.H. Ng, F. Krumeich[1], S.E. Pratsinis[1], P. Novák
Flame co-synthesis of $LiMn_2O_4$ and carbon nanocomposites for high power batteries
doi: 10.1016/j.powsour.2008.10.002, J. Power Sources **189**, 149-154 (2009).
[1] ETH Zürich

A.A. Peterson[1], P. Vontobel, F. Vogel, J.W. Tester[1]
Normal-phase dynamic imaging of supercritical-water salt precipitation using neutron radiography
J. Supercrit. Fluids **49**, 71-78, (2009).
[1] MIT, USA

J. Petrasch[1], P. Osch[1], A. Steinfeld
Dynamics and control of solar thermochemical reactors
Chem. Eng. J. **14**, 362–370 (2009).
[1] ETH Zürich

S. Philippin, P. Laj, J.P. Putaud, A. Wiedensohler, G. De Leeuw, A.M. Fjaeraa, U. Platt, U. Baltensperger, M. Fiebig
EUSAAR - an unprecedented network of aerosol observation in Europe
Earozoru Kenkyu **24**, 78-83 (2009).

N. Piatkowski[1], C. Wieckert, A. Steinfeld
Experimental investigation of a packed-bed solar reactor for the steam-gasification of carbonaceous feedstocks
Fuel Process. Technol. **90**, 360–366 (2009).
[1] ETH Zürich

N. Prasianakis, I.Karlin[1], I. Mantzaras, K. Boulouchos[1]
Lattice Boltzmann method with restored Galilean invariance
Phys. Rev. E **79**, 066702 (2009).
[1] ETH Zürich

S. Rabe, F. Vogel, T.-B. Truong, T. Shimazu[1], T. Wakasugi[1], H. Aoki[1], H. Sobukawa[1]
Catalytic reforming of gasoline to hydrogen: Kinetic investigation of deactivation processes
Int. J. Hydrogen Energy **34**, 8023-8033 (2009).
[1] Toyota, Japan

J. Requies, S. Rabe, F. Vogel, T.-B. Truong, K. Filonova, V.L. Barrio[1], J. Cambra[1], B. Güemez[1], P.L. Arias[1]
Reforming of methane over noble metal catalysts: catalyst deactivation induced by thiophene
Catal. Today **143**, 9-16 (2009).
[1] University Bilbao, Spain

M. Reum, S. A. Freunberger, A. Wokaun, F.N. Büchi
Measuring the current distribution with sub-millimeter resolution in PEFCs
II. Impact of operating parameters
doi: 10.1149/1.3043422, J. Electrochem. Soc. **156**, B301-B310 (2009).

M. Reum, A. Wokaun, F.N. Büchi
Measuring the current distribution with submillimeter resolution in PEFCs
III. Influence of the flow field geometry
doi: 10.1149/1.3187913, J. Electrochem. Soc. **156**, B1225-B1231 (2009).

C.E. Reynolds-Henne, M. Saurer, R.T.W. Siegwolf
Temperature versus species-specific influences on the stable oxygen isotope ratio of tree rings
Trees-Structure and Function **23**, 4, 801-811 (2009).

A. Richter, W. Wanek, R.A. Werner, J. Ghashghaie, M. Jaggi, A. Gessler, E. Brugnoli, E. Hettmann, S.G. Gottlicher, Y. Salmon, C. Bathellier, N. Kodama, S. Nogues, A. Soe, F. Volders, K. Sorgel, A. Blochl, R.T.W. Siegwolf, N. Buchmann, G. Gleixner
Preparation of starch and soluble sugars of plant material for the analysis of carbon isotope composition: a comparison of methods
Rapid Commun. Mass Spectrom. **23**, 2476-2488 (2009).

F. Rosciano, J.F. Colin, F. La Mantia, N. Tran, P. Novák
Electrochemical stress at high potential to investigate phase transitions in $Li_{1+x}(Ni_{1/3}Mn_{1/3}Co_{1/3})_{1-x}O_2$
doi: 10.1149/1.3130042, Electrochem. Solid-State Lett. **12**, A140-A144 (2009).

S. Rossano[1,2], L. Jean-Soro[2], B. Boizot[1], F. Farges[3], E. van Hullebusch[2], J. Labanowski[2], L. Gouzin[4], R. Combes[2], J. Linares[2], J. C. Swarbrick[5], M. Harfouche
Oxidation state variation under β-irradiation in an iron-bearing soda lime glass system
Proc. XAFS14 Conference, Camerino, Italy, July 26-31 (2009)
J. Phys.: Conf. Ser. **190,** 012194 (2009).
[1] CEA-CNRS-Ecole Polytechnique, Palaiseau, France
[2] Université de Paris-Est Marne la Vallée, France
[3] Muséum National d'Histoire Naturelle de Paris, France
[4] Université de Poitiers, France
[5] European Synchrotron Radiation Facility (ESRF), Grenoble, France

A.A. Rouff, S. Rabe, M. Nachtegaal, F. Vogel
X-ray absorption fine structure study of the effect of protonation on disorder and multiple scattering in phosphate solutions and solids
J. Phys. Chem. A **113**, 6895-6903 (2009).

P.W. Ruch, R. Kötz, A. Wokaun
Electrochemical characterization of single-walled carbon nanotubes for electrochemical double layer capacitors using non-aqueous electrolyte
doi: 10.1016/j.electacta.2009.03.022, Electrochim. Acta **54**, 4451-4458 (2009).

P.W. Ruch, D. Cericola, M. Hahn[1], R. Kötz, A. Wokaun
On the use of activated carbon as a quasi-reference electrode in non-aqueous electrolyte solutions
doi: 10.1016/j.jelechem.2009.09.007, J. Electroanal. Chem. **636**, 128-131 (2009).
[1] Honeywell Speciality Chemicals, Germany

P.W. Ruch, L.J. Hardwick, M. Hahn, A. Foelske, R. Kötz, A. Wokaun
Electrochemical doping of single-walled carbon nanotubes in double layer capacitors studied by in situ Raman spectroscopy
doi: 10.1016/j.carbon.2008.08.023, Carbon **47**, 38-52 (2009).

F. Rütten, I. Alxneit, H.R. Tschudi
Kinetics of homogeneous nucleation and condensation of n-butanol at high supersaturation
Atmos. Res. **92**, 124 (2009).

M. Saurer, A.S.H. Prévôt, J. Dommen, J. Sandradewi, U. Baltensperger, R.T.W. Siegwolf
The influence of traffic and wood combustion on the stable isotopic composition of carbon monoxide
Atmos. Chem. Phys. **9**, 3147-3161 (2009).

N.R. Schiele[1], R.A. Koppes[1], D.T. Corr[1], K. S. Ellison[1], D.M. Thompson[1], L.A. Ligon[1], T. Lippert, D.B. Chrisey[1]
Laser direct writing of combinatorial libraries of idealized cellular constructs: biomedical applications
Appl. Surf. Sci. **255**, 5444-5447 (2009).
[1] Rensselaer Polytechnic Institute, USA

T.J. Schildhauer, E. Newson, A. Wokaun
Closed cross flow structures – Improving the heat transfer in fixed bed reactors by enforcing radial convection
Chem. Eng. Process. **48**, 321-328 (2009).

M.Schubert, J.W. Regler, F. Vogel
Continuous salt precipitation and separation from supercritical water. Part 1: Type 1 salts
J. Supercrit. Fluids **52**, 99-112 (2009).

M.Schubert, J.W. Regler, F. Vogel
Continuous salt precipitation and separation from supercritical water. Part 2: Type 2 salts and mixtures of two salts
J. Supercrit. Fluids **52**, 113-124 (2009).

H. Schulenburg, E. Müller[1], G. Khelashvili[2], T. Roser, H. Bönnemann[2], A. Wokaun, G. G. Scherer
Heat-treated $PtCo_3$ nanoparticles as oxygen reduction catalysts
doi: 10.1021/jp808134j, J. Phys. Chem. C **113**, 4069–4077 (2009).
[1] ETH Zürich
[2] Forschungszentrum Karlsruhe, Germany

L. Schunk, A. Steinfeld
Kinetics of the thermal dissociation of ZnO exposed to concentrated solar irradiation using a solar-driven thermogravimeter in the 1800-2100 K range
AIChE J. **55**, 1497-1504 (2009).

L. Schunk, W. Lipinski[1], A. Steinfeld
Ablative heat transfer in a shrinking packed-bed of ZnO undergoing solar thermal dissociation
AIChE J. **55**, 1659-1666 (2009).
[1] ETH Zürich

L. Schunk, W. Lipinski[1], A. Steinfeld
Heat transfer model of a solar receiver-reactor for the thermal dissociation of ZnO – Experimental validation at 10 kW and scale-up to 1 MW
Chem. Eng. J. **150**, 502-508 (2009).
[1] ETH Zürich

B.C. Seyfang, R. Fardel[1], T. Lippert, G.G. Scherer, A. Wokaun
Micro-patterning for polymer electrolyte fuel cells: Single pulse laser ablation of aluminium films from glassy carbon
Appl. Surf. Sci. **255**, 5471-5475 (2009).
[1] EMPA Dübendorf

J.E. Shilling, Q. Chen, S.M. King, T. Rosenoern, J.H. Kroll, D.R. Worsnop, P.F. DeCarlo, A.C. Aiken, D. Sueper, J.L. Jimenez, S.T. Martin
Loading-dependent elemental composition of α-pinene SOA particles
Atmos. Chem. Phys. **9**, 771-782 (2009).

Y. Shinozuka, A.D. Clarke, P.F. DeCarlo, J.L. Jimenez, E.J. Dunlea, E.J. Roberts, G.C. Roberts, J.M. Tomlinson, D.R. Collins, S.G. Howell, V.N. Kapustin, C.S. McNaughton, J. Zhou
Aerosol optical properties relevant to regional remote sensing of CCN activity and links to their organic mass fraction: airborne observations over Central Mexico and the US West Coast during MILAGRO/INTEX-B
Atmos. Chem. Phys. **9**, 6727-6742 (2009).

A. Shkabko[1], M. Aguirre[1], I. Marozau, T. Lippert, A. Weidenkaff[1]
Measurements of current-induced heating in the Al/$SrTiO_{3-x}N_y$/Al memristor during electroformation and resistance switching
Appl. Phys. Lett. **95**, 152109 (2009).
[1] EMPA Dübendorf

A. Shkabko[1], M. Aguirre[1], I. Marozau, T. Lippert, Y.-S. Chou[2], R. E. Douthwaite[2], A. Weidenkaff[1]
Synthesis and transport properties of of $SrTiO_{3-x}N_y$/$SrTiO_{3-\delta}$ layered structures produced by microwave-induced plasma nitridation
J. Phys D: Appl. Phys. **42**, 145202 (2009).
[1] EMPA Dübendorf
[2] University of York, UK

A. Shkabko[1], M.H. Aguirre[1], I. Marozau, T. Lippert, A. Weidenkaff[1]
Resistance switching at the Al/$SrTiO_{3-x}N_y$ anode interface
Appl. Phys. Lett. **94**, 212102-3 (2009).
[1] EMPA Dübendorf

A. Shkabko[1], M. Aguirre[1], I. Marozau, M. Döbeli[2], M. Mallepell[2], T. Lippert, A. Weidenkaff[1]
Synthesis and characterization of microwave plasma treated $SrTiO_3$
Mat. Chem. Phys. **115**, 86-92 (2009).
[1] EMPA Dübendorf
[2] PSI / ETH Zürich

O.V. Sidorova, R.T.W. Siegwolf, M. Saurer, A.V. Shashkin, A.A. Knorre, A.S. Prokushkin, E.A. Vaganov, A.V. Kirdyanov
Do centennial tree-ring and stable isotope trends of Larix gmelinii (Rupr.) Rupr. indicate increasing water shortage in the Siberian north?
Oecologia **161**, 825-835 (2009).

F. Simmen, T. Lippert, P. Novák, B. Neuenschwander[1], M. Döbeli[2], M. Mallepell[2], A. Wokaun
Influence of the substrate material on the properties of pulsed laser deposited thin $Li_{1+x}Mn_2O_{4-\delta}$ films
Appl. Surf. Sci. **255**, 5303-5307 (2009).
[1] Berner Fachhochschule, Burgdorf
[2] PSI / ETH Zürich

M. Sing[1], G. Berner[1], K. Groß[1], A. Müller[1], A. Ruff, A. Wetscherek[1], S. Thiel[2], J. Mannhart[2], S. A. Pauli, C.W. Schneider, P.R. Willmott, M. Gorgoi[3], F. Schäfers[3], R. Claessen[1]
Profiling the interface electron gas of $LaAlO_3$ / $SrTiO_3$ heterostructures with hard X-ray photoelectron spectroscopy
Phys. Rev. Lett. **102**, 176805 (2009).
[1] Universität Würzburg, Germany
[2] Universität Augsburg, Germany
[3] Berliner Elektronenspeicherring-Gesellschaft für Synchrotronstrahlung m.b.H.,Germany

J. Stötzel[1], D. Lützenkirchen-Hecht[1], R. Frahm[1], B. Kimmerle[2], A. Baiker[2], M. Nachtegaal, M.J. Beier[3], J.-D. Grunwaldt[3]
Investigation of the ignition behaviour of the noble metal catalyzed catalytic partial oxidation of methane
J. Phys.: Conf. Ser. **190**, 012162 (2009).
[1] Wuppertal University, Germany
[2] ETH Zürich
[3] DTU Copenhagen, Denmark

J. Stötzel[1], D. Lützenkirchen-Hecht[1], R. Frahm[1], B. Kimmerle[2], A. Baiker[2], M. Nachtegaal, M.J. Beier[3], J.-D. Grunwaldt[3]
Reduction and re-oxidation of Cu/Al_2O_3 catalysts investigated with quick-scanning XANES and EXAFS
J. Phys.: Conf. Ser. **190**, 012153 (2009).
[1] Wuppertal University, Germany
[2] ETH Zürich
[3] DTU Copenhagen, Denmark

R.P.W.J. Struis, T.J. Schildhauer, I. Czekaj, M. Janousch, Ch. Ludwig, S.M.A. Biollaz
Sulphur poisoning of Ni catalysts in the SNG production from biomass: A TPO/XPS/XAS study
Appl. Catal. A **362**,121-128 (2009).

R.P.W.J. Struis, D. Bachelin, Ch. Ludwig, A. Wokaun
Studying the Formation of Ni_3C from CO and Metallic Ni at T = 265 °C in Situ using Ni K-Edge X-ray absorption spectroscopy
J. Phys. Chem. C **113**, 2443-2451 (2009).

R.P.W.J. Struis, M. Nachtegaal, H. Mattenberger, Ch. Ludwig
The fate of lead in MSWI-fly ash during heat treatment: An X- ray absorption spectroscopy study
Adv. Eng. Mater. **11**, 507-512 (2009).

S. Stucki, F. Vogel, Ch. Ludwig, A.G. Haiduc[1], M. Brandenberger
Catalytic gasification of algae in supercritical water for biofuel production and carbon capture
Energy Environ. Sci. **2**, 535–541 (2009).
[1] EPF Lausanne

S. Szidat, M. Ruff, N. Perron, L. Wacker, H.-A. Synal, M. Hallquist, A.S. Shannigrahi, K.E. Yttri, C. Dye, D. Simpson
Fossil and non-fossil sources of organic carbon (OC) and elemental carbon (EC) in Göteborg, Sweden
Atmos. Chem. Phys. **9**, 1521-1535 (2009).

O.A. Tarasova, I.A. Senik, M.G. Sosonkin, J. Cui, J. Staehelin, A.S.H. Prévôt
Surface ozone at the Caucasian site Kislovodsk High Mountain Station and the Swiss Alpine site Jungfraujoch: data analysis and trends (1990-2006)
Atmos. Chem. Phys. **9**, 4157-4175 (2009).

A.C. Targino, H. Coe, J. Cozic, J. Crosier, I. Crawford, K. Bower, M. Flynn, M. Gallagher, J. Allan, B. Verheggen, E. Weingartner, U. Baltensperger, T. Choularton
Influence of particle chemical composition on the phase of cold clouds at a high-alpine site in Switzerland
J. D18206, doi: 10.1029/2008jd011365, Geophys. Res. Atmos. **114** (2009).

T. Todorova, O. Kröcher, B. Delley
DFT study of structural and vibrational properties of guanidinium derivatives
THEOCHEM **907**, 16-21 (2009).

V. Trabadelo[1], A. Retolaza[1], S. Merino[1], A. Cruz[2], P. Heredia[2], A. Foelske, H. Schift, C. Padeste
Protein patterning by thermal nanoimprint lithography and NH_3-plasma functionalization of polystyrene
doi: 10.1116/1.3123304, J. Vac. Sci. Technol. B **27**, 1060-1062 (2009).
[1] Fundación Tekniker, Eibar, Gipuzkoa, Spain
[2] Gaiker, Parque Tecnológico, Zamudio, Bizkaia, Spain

K.S. Treydte, D.C. Frank, M. Saurer, G. Helle, G.H. Schleser, J. Esper
Impact of climate and CO_2 on a millennium-long tree-ring carbon isotope record
Geochim. Cosmochim. Acta **73**, 4635-4647 (2009).

S. Ulli-Beer, M. Bosshardt, P. Dietrich, A. Wokaun
What alternative drive-train technologies and policies are needed to meet a 50% CO_2 reduction target? The case of the EU-fleet” DN: 2009-01-0319
SAE World Congress "Racing to Green Mobility". Sustainable GHG Emission. Detroit MI USA, April (2009).

O. Vesna, M. Sax, M. Kalberer, A. Gaschen, M. Ammann
Product study of oleic acid ozonolysis as function of humidity
Atmos. Environ. **43**, 3662-3669 (2009).

A. Volkmer, P.P. Radi, A.M. Zheltikov, A. Zumbusch
New trends and recent advances in coherent Raman microscopy and nonlinear optical spectroscopy: introduction to the special issue
J. Raman Spectrosc. **40**, 712-713 (2009).

J.M. Wälle[1], J. Koch[1], L. Flamigni[1], S. Heiroth, T. Lippert, W. Hartung[1], N.D. Spencer[1], D. Günther[1]
"Corrected" transport efficiencies and detection yields in nano- and femtosecond laser ablation inductively coupled plasma mass spectrometry
Spectrochimica Acta Part B **64**, 109112 (2009).
[1] ETH Zürich

S.R. Waldvogel[1], I.M. Malkowsky[2], U. Griesbach[2], H. Pütter[2], A. Fischer[2], M. Hahn, R. Kötz
Novel fluorine-free electrolyte system for supercapacitors
doi: 10.1016/j.elecom.2009.04.009, Electrochem. Commun. **11,** 1237-1241 (2009).
[1] Universität Bonn, Germany
[2] BASF SE, Ludwigshafen, Germany

A.M. Walser, M. Meisinger, P.P. Radi, T. Gerber, G. Knopp
Resonant UV-fs_TCFWM spectroscopy of formaldehyde
Phys. Chem. Chem. Phys. **38**, 8456-8466 (2009).

S. Weimer, C. Mohr, R. Richter, J. Keller, M. Mohr, A.S.H. Prévôt, U. Baltensperger
Mobile measurements of aerosol number and volume size distributions in an Alpine valley: Influence of traffic versus wood burning
Atmos. Environ. **43**, 624–630 (2009).

K.P. Wyche, P.S. Monks, A.M. Ellis, R.L. Cordell, A.E. Parker, C. Whyte, A. Metzger, J. Dommen, J. Duplissy, A.S.H. Prévôt, U. Baltensperger, A.R. Rickard, F. Wulfert
Gas phase precursors to anthropogenic secondary organic aerosol: detailed observations of 1,3,5-trimethylbenzene photooxidation
Atmos. Chem. Phys. **9**, 635-665 (2009).

R.J. Yokelson, J.D. Crounse, P.F. DeCarlo, T. Karl, S. Urbanski, E. Atlas, T. Campos, Y. Shinozuka, V. Kapustin, A.D. Clarke, A. Weinheimer, D.J. Knapp, D.D. Montzka, J. Holloway, P. Weibring, F. Flocke, W. Zheng, D. Toohey, P.O. Wennberg, C. Wiedinmeyer, L. Mauldin, A. Fried, D. Richter, J. Walega, J.L. Jimenez, K. Adachi, P.R. Buseck, S.R. Hall, R. Shetter
Emissions from biomass burning in the Yucatan
Atmos. Chem. Phys. **9**, 5785-5812 (2009).

A. Z'Graggen[1], A. Steinfeld
Heat and mass transfer analysis of a suspension of reacting particles subjected to concentrated solar radiation - application to the steam-gasification of carbonaceous materials
Int. J. Heat Mass Transfer **52**, 385–395 (2009).
[1] ETH Zürich

Conference Proceedings / Other Papers

E.M.C. Alayon[1], J. Singh[1], M. Nachtegaal, M. Harfouche, J. A. van Bokhoven[1]
In situ XAS probes partially oxidized platinum generating high activity for CO oxidation
Proc. XAFS14 Conference, Camerino, Italy, July 26-31 (2009).
J. Phys.: Conference Series **190**, 012152 (2009).
[1] ETH Zürich

F. Amato, M. Furger, M. Pandolfi, X. Querol, A. Alastuey, N. Bukowiecki, R. Gehrig, A. Richard, A.S.H. Prévôt, U. Baltensperger
Road dust emission profiles and levels from paved road in Mediterranean and central European cities
EGU 2009, Vienna, Austria, European Geosciences Union, April 19-24 (2009).

S. Andreani-Aksoyoğlu, J. Keller, I. Barmpadimos, D. Oderbolz, M. Tinguely, A.S.H. Prévôt, R. Alfarra, J. Sandradewi
Modelling of air quality for winter and summer episodes in Switzerland
Paul Scherrer Institute, PSI Report Nr. 09-06, May (2009).

S. Andreani-Aksoyoglu, J. Keller, D. Oderbolz, I. Barmpadimos, A.S.H. Prévôt, U. Baltensperger, R. Sokhi
Modelling of aerosol composition in Switzerland: seasonal and annual variability
Air Quality 2009, Istanbul, Turkey, March 24-27 (2009).

S. Andreani-Aksoyoglu, D. Oderbolz, J. Keller, I. Barmpadimos, A.S.H. Prévôt, U. Baltensperger
Application of CAMx model in Switzerland with the new SOA mechanism
NATO/SPS ITM Air Pollution Modelling and its Application, San Francisco, USA, May 18-22 (2009).

U. Baltensperger, P.F. DeCarlo, M.R. Alfarra, R. Chirico, M. Heringa, J. Dommen, J. Duplissy, A.S.H. Prévôt, T. Tritscher, E. Weingartner, N.M. Donahue
Source apportionment and chemical features of the organic aerosol using aerosol mass spectrometers
Proc. Geochimica Et Cosmochimica Acta **73**, A82, June 21 (2009).

M.H. Bayer, A. Wokaun, G.G. Scherer, I.A. Schneider
Dynamic measurement and modeling of the water vapor concentration during ac impedance measurements in polymer electrolyte fuel cells (PEFCs)
Electrochem. Soc. Trans. **25**, 949-960 (2009).

Ph. Bernardo, J. Dentzer[1], R. Gadiou[1], W. Märkle, J. Saint[2], D. Goers[2], M.E. Spahr[2], P. Novák, C. Vix-Guterl[1]
Influence of graphite surface properties on the first lithium insertion in Li-ion batteries
Extended Abstract, CARBON 2009, Biarritz, France, June 14-19, Abstract No. T4-835 (2009).
[1] Institute for Material Science of Mulhouse, France
[2] TIMCAL SA, Bodio

M. Bouza,
Technological change in the automobile industry: Concepts
Working paper DIS Paul Scherrer Institut, February (2009).

M. Bouza, S. Ulli-Beer, P. Dietrich, A. Wokaun
Comparison of possible transformation processes in the automobile industry
Proc. 9th Swiss Transportation Research Conference, Monte Verità, Ascona, September 9-11 (2009).

M. Bouza, S. Ulli-Beer, P. Dietrich, A. Wokaun
Endogenous transformation in the automobile industry
Proc. 27th International Conference of the System Dynamics Society, Albuquerque, New Mexico, USA, July 26-30 (2009).

N. Bukowiecki, P. Lienemann, R. Figi, M. Hill, A. Richard, M. Furger, K. Rickers, S.S. Cliff, U. Baltensperger, R. Gehrig
Emission factors and source apportionment for abrasion particles produced by road traffic
Proc. EGU General Assembly 2009, Vienna, Geophysical Research Abstracts **11**, 2945, Apri 19-24 (2009).

I. Czekaj, F. Loviat, J. Wambach, A. Wokaun
DFT modelling and XPS studies of model Ni/Al_2O_3catalyst: Nickel particles behaviour
Proc. EuropaCat IX, Salamanca, Spain, August 30 – September 4 (2009).

S. Daniele, P. Jansohn, K. Boulouchos[1]
Turbulent flame speed of lean premixed syngas combustion at gas turbine relevant conditions
ASME Turbo Expo 2009, Paper GT2009-59477, June 8-12 (2009).
[1] ETH Zürich

S. Daniele, P. Jansohn, K. Boulouchos[1]
Lean premixed syngas combustion: Operational window and turbulent flame speed
Proc. VDI-Tagung "24. Deutscher Flammentag 2009 – Verbrennung und Feuerungen", September 16-17, VDI-Berichte Nr. 2056, 73-78 (2009).
[1] ETH Zürich

S. Daniele, P. Jansohn, K. Boulouchos
Flame front characteristic and turbulent flame speed of lean premixed syngas combuston at gas turbine relevant conditions
Proc. ASME Turbo Expo, June (2009).

P.F. DeCarlo, R. Chirico, M.F. Heringa, T. Tritscher, M. Gysel, E. Weingartner, A.S.H. Prévôt, U. Baltensperger
Smogchamber investigations of primary and secondary organic aerosol from combustion sources
Proc. Goldschmidt Conference, Davos, June 21, Geochim. Cosmochim. Acta **73**, A272 (2009).

J. Dommen, H. Hellen, A. Metzger, K. Gaeggeler, U. Baltensperger
Analysis of secondary organic aerosols by PTR-MS
Proc. 4th International Conference on Proton Transfer Reaction Mass Spectrometry and its Applications, Obergurgl, Austria, Innsbruck University Press, 110-113, February 15-20 (2009).

J. Dubrail[1], F. Farges[2], L. Gautron[1], M. Harfouche, C. Borca[3], D. Grolimund
Pb in naturally irradiated monazites and zircons
Proc. XAFS14 Conference, Camerino, Italy, July 26-31 (2009).
J. Phys.: Conf. Ser. **190,** 012180 (2009).
[1] Université de Paris-Est Marne la Vallée, France
[2] Muséum National d'Histoire Naturelle de Paris, Paris, France

W. Durisch, J.-C. Mayor, K.-H. Lam[1], S. Dittmann[2], D.Chianese[2]
Climate Impacts on the Efficiency of a p-Si PV Module and Annual Output under Real Working Conditions
ISBN: 3-936338-25-6, Proc. 24th European Photovoltaic Solar Energy Conference and Exhibition, Hamburg, Germany, September 21-25, 3573-3576 (2009).
[1] University of Hong Kong, China
[2] SUPSI-ISAAC, Canobbio

M. Furger, F. Amato, A. Alastuey, N. Bukowiecki, R. Gehrig, C. Mohr, M. Pandolfi, A.S.H. Prévôt, X. Querol, A. Richard, S. Weimer, U. Baltensperger
Measurements of traffic-induced abrasion particles in a Swiss city
EGU General Assembly 2009, Vienna, Austria, European Geosciences Union, April 19-24 (2009).

S. Groesser; S. Ulli-Beer, S. Bruppacher, R. Kaufmann-Hayoz
Diffusionsdynamik energieeffizienter Bauten: Ergebnisse
Abschlussbericht des NFP 54 Projekts, Universität Bern (2009).

A.G. Haiduc[1], M. Brandenberger, M.L. Molina[1], F. Vogel, R. Bernier-Latmani[1], Ch. Ludwig
Controlling the materials cycles in a new process for resource efficient fuel production from microalgae
R'World Congress 2009, Davos, **154**, September 14-16 (2009).
[1] EPF Lausanne

M. Harfouche, J. Labanowski[1], F. Farges[2], E. van Hullebusch[3], C. Borca, D. Grolimund, F. van Oort[4]
Assessment of Zn bioavailability: XAFS study on speciation of zinc-particulate organic matter associations in polluted soils
Proc. XAFS14 Conference, Camerino, Italy, July 26-31 (2009).
J. Phys.: Conf. Ser. **190**, 012189 (2009)
[1] UMR CNRS 6008, Université de Poitiers, France
[2] Muséum National d'Histoire Naturelle de Paris, UMR CNRS 7202, Paris, France
[3] Univiversité de Paris-Est Marne la Vallée, France
[4] UR, Physico-chimie et Ecotoxicologie des SolS d Agrosystèmes Contaminés, Versailles, France

H. Herich, T. Tritscher, A. Wiacek, M. Gysel, E. Weingartner, U. Lohmann, U. Baltensperger, D.J. Cziczo
Water uptake of clay and desert dust aerosol particles at sub- and supersaturated water vapor conditions
Proc. Goldschmidt Conference, Davos, June 21, Geochim. Cosmochim. Acta **73**, A524 (2009).

J. Judex, S. Daniele, J.-L. Hersener[1], S.M.A. Biollaz, P. Jansohn
Investigations about cofiring of herbaceous biomass in an integrated gasification combined cycle
4th International Conference on Clean Coal Technologies / 3rd International Freiberg Conference on IGCC and XtL, Proceedings, Dresden, Germany, May 17-21 (2009).
[1] Ingenieurbüro Hersener, Wiesendangen

J. Judex, S.M.A. Biollaz, U. Baier[1], S. Baum[1]
Biogas-Aufbereitung: Methanverlust von 1% technisch möglich
Gas Wasser Abwasser (GWA), **10**, 803 (2009).
[1] HSW Wädenswil

P. Jansohn
Forschungsprogramm "Kraftwerk 2020"
Jahresberichte der Programmleiter, Bundesamt für Energie, BFE (2009).

L. Kammermann, A. Gysel, E. Weingartner, U. Baltensperger
Hygroscopicity of tropospheric aerosols: one year of measurements at Jungfraujoch (3580 m asl.)
Proc. Goldschmidt Conference, Davos, June 21, Geochim. Cosmochim. **73,** A618 (2009).

S. Karagiannidis, I. Mantzaras, R. Bombach, S. Schenker, K. Boulouchos[1]
Experimental and numerical investigation of the hetero-/homogenous combustion of lean propane/air mixtures over platinum
Proc. Combust. Inst. **32**, 1947-1955 (2009).
[1] ETH Zürich

J. Keller, I. Barmpadimos, S. Andreani-Aksoyoglou, C.D. Oderbolz, M. Deserti, M. Tinguely, A.S.H. Prévôt
Model evaluation study in Po basin
Proc. Air Quality - Science and Application, Istanbul, University of Hertfordshire, 156, March 24-27 (2009).

A.V. Kirdyanov, A.A. Knorre, M. Saurer, O.V. Sidorova, R.T.W. Siegwolf
Stable isotopes ($\delta^{13}C$ and $\delta^{18}O$) in Larix Sibirica tree rings under dry conditions in the forest-steppe in Siberia during the last 150 years
EGU General Assembly, European Geosciences Union, April 19-24, 2009.

R. Kötz, P.W. Ruch, D. Cericola
In-situ monitoring of EDLC operation by physico-chemical techniques
Extended Abstract, Advanced Automotive Battery & EC Capacitor Conference AABC, Session 1,
Long Beach, California, USA, June 8-10 (2009).

N. Linse, C. Aellig, A. Wokaun, G.G. Scherer, L. Gubler
Influence of operating parameters on start/stop induced degradation in polymer electrolyte fuel cells
Electrochem. Soc. Trans. **25**, 1849-1859 (2009).

P.G. Loutzenhiser, M.E. Gálvez[1], I. Hischier[2], A. Stamatiou, A. Frei, A. Meier, A. Steinfeld
Kinetic analysis of CO_2 splitting via two-step solar thermochemical cycles with Zn/ZnO and FeO/Fe_3O_4 redox reactions
Proc. 15th SolarPACES Conference, Berlin, Germany, September 15-18 (2009).
[1] Instituto de Carboquímica, Zaragoza, Spain
[2] ETH Zürich

P.G. Loutzenhiser, M.E. Galvez[1], I. Hischier[2], A. Stamatiou. A. Steinfeld
CO_2 splitting in a hot-walled aerosol reaction via the two-step Zn/ZnO solar thermochemical cycle
Proc. 3rd International Conference on Energy Sustainability, San Francisco, CA, USA, July 19-23 (2009).
[1] Instituto de Carboquímica, Zaragoza, Spain
[2] ETH Zürich

P.G. Loutzenhiser, A. Stamatiou, A. Steinfeld
CO_2 splitting via two-step solar thermochemical cycles via metal oxide redox reactions – Thermodynamic and kinetic analyses
ACS 238th National Meeting – Division of Fuel Chemistry, Washington D.C. USA, August 16-20 (2009).

I. Mantzaras, R. Bombach, R. Schaeren
Hetero-/homogeneous combustion of hydrogen/air mixtures over platinum at pressures up to 10 bar
Proc. Combust. Inst. **32**, 1937-1945 (2009).

A. Meier, C. Sattler[1], C. Richter[2]
Special report on solar fuels
International Energy Agency – SolarPACES Annual Report 2008, C. Richter ed., Chapter 2 (2009).
[1] DLR Cologne, Germany
[2] DLR Almería, Spain

A. Meier
Task II: Solar Chemistry
International Energy Agency – SolarPACES Annual Report 2008, C. Richter ed., Chapter 4 (2009).

A. Meier, C. Sattler[1]
Solar fuels from concentrated sunlight
International Energy Agency – SolarPACES, Brochure (2009).
[1] DLR Cologne, Germany

M.M. Menamparambath, A. Wokaun, G.G. Scherer, L. Gubler
Locally resolved degradation analysis of chemically aged radiation grafted polymer electrolyte membranes
ISBN 978-84-934398-6-6, Proc. 5th European Summer School on Electrochemical Engineering, Almagro, Spain, September 6-11, 2009, Electrochemical Engineering: Industrial, Energy and Environmental Applications, 398-401 (2009).

M.M. Menamparambath, A. Wokaun, G.G. Scherer, L. Gubler
Insights into the local degradation of chemically aged radiation grafted membranes
Proc. European Fuel Cell Forum 2009, Luzern, June 29 – July 2, 2009.

C. Mohr, S. Weimer, C. Good, R. Richter, A.S.H. Prévôt, U. Baltensperger
Mobile Messungen der Partikelzusammensetzung im Rheintal und in der Stadt Zürich. Winter 2007/2008.
PSI-Bericht Nr. 09-09, Villigen, Paul Scherrer Institut, Juli (2009).

M. Müller, M. Graus, A. Metzger, J. Dommen, A. Wisthaler, A. Hansel
Analysis of High Mass Resolution PTR-TOF Spectra from 1,3,5-trimethylbenzene (TMB) Smog Chamber Experiments
- EGU General Assembly 2009, Vienna, Austria, European Geosciences Union, April 19-24 (200(9.
- Proc. 4th International Conference on Proton Transfer Reaction Mass Spectrometry and its Applications, Obergurgl, Austria, Innsbruck, February 16-21, University Press, 261-262 (2009).

P. Oberholzer, P. Boillat, R. Perego, E.H. Lehmann, G.G. Scherer, A. Wokaun
High resolution neutron imaging of liquid water in polymer electrolyte fuel cells (PEFC)
Proc. 5th European Summer School on Electrochemical Engineering, Almagro, Spain, September 6-11, 2009: Electrochemical Engineering: Industrial, Energy and Environmental Applications, 430-432 (2009).
ISBN 978-84-934398-6-6

R. Pitz-Paal[1], T. Merz[2], N. Bayer Botero[1], A. Steinfeld
Heliostat field layout optimization for high-temperature solar thermochemical processing
Proc. 15th SolarPACES Conference, Berlin, Germany, September 15-18 (2009).
[1] DLR Cologne, Germany
[2] ETH Zürich

G. Pizza, I. Mantzaras, C. Frouzakis1, A. Tomboulides[2], K. Boulouchos[1]
Suppression of combustion instabilities of premixed hydrogen/air flames in microchannels using heterogeneous reactions
Proc. Combust. Inst. **32**, 3051-3058 (2009).
[1] ETH Zürich
[2] University of Western Macedonia, Greece

N.I. Prasianakis, I.V.Karlin[1]
Lattice Boltzmann method for heat and mass transfer engineering applications
International conference on computational methods for thermal problems, September 8-10, Napoli, Italy, 145-148 (2009).
[1] ETH Zürich

A. Richard, M. Furger, N. Bukowiecki, P. Lienemann, M. Nachtegaal, A.S.H. Prévôt, U. Baltensperger
Hourly size-segregated sampling of trace elements and subsequent source apportionment
Proc Goldschmidt Conference, Davos, June 21, Geochim. Cosmochim. Acta **73**, A1097 (2009).

S. Rossano, L. Jean-Soro, B. Boizot, F. Farges, E. van Hullebusch, J. Labanowski, L. Gouzin, R. Combes, J. Linares, J.C. Swarbrick, M. Harfouche
Oxidation state variation under β-irradiation in an iron-bearing soda lime glass system
Proc. XAFS14 Conference, Camerino, Italy, July 26-31 (2009), J. Phys. Conf. Ser. **190**, 012194 (2009).

A. Savouchkina, A. Foelske-Schmitz, R. Kötz, G.G. Scherer, A. Wokaun, J. Ziegler, C. Padeste, V. Auzelyte, H.H. Solak,
Extreme ultraviolet Interference lithography for production of Pt nanoparticles on glassy carbon
216th ECS Conference, ECS Transactions, **25**, Vienna, October 4-9 (2009).

T.J. Schildhauer, S.M.A. Biollaz
Fluidized bed methanation technology for improved production of SNG from coal
Proc. 4th International Conference on Clean Coal Technologies/3rd International Freiberg Conference on IGCC and XtL, , Dresden, Germany, May 17-21 (2009).

I.A. Schneider, M.H. Bayer, A. Wokaun, G.G. Scherer
Negative resistance values in locally resolved impedance spectra of polymer electrolyte fuel cells
Electrochem. Soc. Trans. **25**, 937 (2009).

G.A. Schuler, A. Wokaun, F.N. Büchi
Experimental investigation of the local membrane permeation characteristics in PEFC
Proc. European Fuel Cell Forum, Luzern, June 29 - July 2 (2009).

L.O. Schunk, D. Gstoehl, A. Meier, A. Steinfeld
Solar thermal dissociation of ZnO – reactor modeling and optimization for scale-up
Proc. 15th SolarPACES Conference, Berlin, Germany, September 15-18 (2009).

B. Schwanitz, H. Schulenburg, A. Wokaun, G. G. Scherer
Ultra low Pt anodes for polymer electrolyte fuel cells
Proc. European Fuel Cell Forum, Luzern, June 29 - July 2 (2009).

B. Seyfang, P.Boillat, G.G. Scherer, T. Lippert, A. Wokaun,
Miniaturized polymer electrolyte fuel cell without gas diffusion layers
Proc. European Fuel Cell Forum 2009, Luzern, June 30 - July 2 (2009).

O.V. Sidorova, R.T.W. Siegwolf, M. Saurer, A.V. Shashkin, A.A. Knorre, A.S. Prokushkin, A.V. Kirdyanov
Modern approach to study of forest ecosystem respond to climate change
Proc. Eco-geographycal aspects of forest process, Krasnoyarsk, Russia, V.N. Sukachev Institute of Forest, September 23-25, SB RAS, 330-332 (2009).

J. Singh[1], E.M.C. Alayon, M. Tromp[2], O.V. Safonova[3], P. Glatzel[3], M. Nachtegaal, R. Frahm[4], J.A. van Bokhoven[1]
Exploring the dynamic platinum structure during CO oxidation
ESRF Highlights 2008, February 4-5 (2009).
[1] ETH Zürich
[2] University of Southampton, UK
[3] ESRF Grenoble, France

T. Tritscher, M.F. Heringa, R. Chirico, M. Gysel, P.F. DeCarlo, J. Dommen, A.S.H. Prévôt, E. Weingartner, U. Baltensperger
Change of physical aerosol properties during aging of primary emissions in a smog chamber
Proc. 18th International Conference on Nucleation and Atmospheric Aerosols, Prague, Czech Republic, August 10-14 (2009).

S. Ulli-Beer, M. Bosshardt, P. Dietrich, A. Wokaun
How do country specific boundary conditions affect the diffusion of alternative drive train technologies in the EU?
Extended abstract of the international advanced mobility forum, PalExpo, Geneva, March 10–12 (2009).

S. von Dahlen, A. Wokaun, G.G. Scherer, I.A. Schneider
Locally resolved cyclic voltammetry in channel and land areas of a polymer electrolyte fuel cell
ISBN 978-84-934398-6-6, Proc. 5th European Summer School on Electrochemical Engineering, Almagro, Spain, September 6-11, 2009: Electrochemical Engineering: Industrial, Energy and Environmental Applications, 433-436 (2009).

S. Walter, C. Ruiz de Castaneda, S. Ulli-Beer, Ch. Bach
Die CityCat H_2, ein wasserstoffbetriebenes Kompaktkehrfahrzeug im Alltagstest
Kommunalmagazin, Januar/Februar (2010).

S. Walter, S. Perret, S. Lienin, S. Ulli-Beer, A. Wokaun
Schritte zur Nischenmarkteinführung eines Kommunalfahrzeuges mit Wasserstoffantrieb: hy.muve / City Cat H_2 Uebergabeanlass vom 14. Mai 2009 in Basel
Bericht im Rahmen des Novatlantis-Projekts "Erlebnisraum Mobilität in der 2000-Watt-Gesellschaft Pilotregion Basel (2009).

M. Wellinger, J. Wochele, Ch. Ludwig
Trace elements in the flue gas of a scrap wood combustor
R'World Congress 2009, Davos, September 14-16, **172** (2009).

C. Wieckert, N. Piatkowski[1], A. Steinfeld
Experimental investigation of a packed-bed solar reactor for steam-gasification of carbonaceous feedstocks
Proc. 15th SolarPACES Conference, Berlin, Germany, September 15-18 (2009).
[1] ETH Zurich

J. Wochele, Ch. Ludwig, S. Stucki
RESH-Behandlung mit KVAplus
Studie im Auftrag der Stiftung Auto Recycling Schweiz, (report can be ordered at SARS) (2009).

T. Yamaki[1], S. Sawada[1], M. Asano[1], Y. Maekawa[1], M. Yoshida[1], L. Gubler, S. Alkan Gürsel, G.G. Scherer
Fuel-cell performance of multiply-crosslinked polymer electrolyte membranes prepared by two-step radiation technique
216th Meeting of the Electrochemical Society, Vienna, Austria, October 4-9, 2009.
doi: 10.1149/1.3210700, Electrochem. Soc. Trans. **25**, 1439-1450 (2009).
[1] Japan Atomic Energy Agency, Takasaki, Japan

M. Zaglio, A. Wokaun, I. Mantzaras, F.N Büchi
1-D dynamic model development and validation for PEFCs
Extended Abstract 6th Symposium on Fuel Cell Modelling and Experimental Validation (MODVAL 6) 66, Bad Herrenalb/Karlsruhe, Germany, March 25-26 (2009).

M. Zaglio, A. Wokaun, I. Mantzaras, F. Büchi
D*evelopment and validation of a dynamic model for PEFCs*
Proc. European Fuel Cell Forum 2009, Luzern, June 29 - July 2 (2009).

P. Zieger, R. Schmidhauser, E. Weingartner, J. Strom, U. Baltensperger
Effects of relative humidity on aerosol light scattering
Proc. Goldschmidt Conference, Davos, June 21, Geochim. Cosmochim. Acta **73**, A1534 (2009).

DISSERTATIONS

H. Ben youcef
Radiation grafted ETFE based membranes for fuel cells: improved mechanical and oxidative stability
Ph.D. Thesis, No. 18215, ETH Zürich, February 4, 2009.

P. Boillat
Advanced characterization of polymer electrolyte fuel cells using high resolution neutron imaging
Ph.D. Thesis, No. 18397, ETH Zürich, May 18, 2009.

M. Bosshardt
Fleet dynamics: Identifying the main micro processes of technological change within the European passenger car fleet
Ph.D. Thesis, No. 17984, ETH Zürich, February 25, 2009.

R. Fardel
Laser-inducef forward transfer for the fabrication of patterned organic light-emitting diodes
Ph.D. Thesis, No. 18192, ETH Zürich, January 14, 2009.

R. Flückiger
Transport phenomena on the channel rib scale of polymer electrolyte fuel cells
Ph.D. Thesis, No. 18509, ETH Zürich, July 3, 2009.

J. Frommer
The chromium X-ray absorption near edge structure. New ways to determine the local molecular environment of trivalent chromium in geochemical samples
Ph.D. Thesis, No. 18550, ETH Zürich, 2009.

J. Kopyscinski
Production of synthetic natural gas in a fluidized bed reactor - Understanding the hydrodynamic, mass transfer, and kinetic effects
Ph.D. Thesis, No.18800, ETH Zürich, December 16, 2009.

A. Kress
Stable isotope dendroclimatology in the Swiss Alps: a 1200-year record from European larch
Ph.D. Thesis, No.18535, ETH Zürich, July, 2009.

I. Marozau
Pulsed laser deposition and characterisation of perovskite-type oxynitride thin films
Ph.D. Thesis, No. 18328, ETH Zürich, April 15, 2009.

M. Meisinger
Single and double-resonance spectroscopy of formaldehyde by four-wave mixing and multiphoton Ionization techniques
PH.D. Thesis, No. 18262, ETH Zürich, February 25, 2009.

T. Patey
Oxide nanoparticles for electrodes in lithium-ion batteries
Ph.D. Thesis, No. 18648, ETH Zürich, November 18, 2009.

G. Pizza
Numerical simulation of premixed flame dynamics in catalytic and non-catalytic ducts
PH.D. Thesis, No. 18367, ETH Zürich, May 2009.

P.W. Ruch
Charge storage and aging phenomena in electrochemical double layer capacitors
Ph.D. Thesis, No. 18400, ETH Zürich, May 18, 2009.

B.C. Seyfang
Simplification and investigation of polymer electrolyte fuel cells using micro-patterned glassy carbon flow fields
Ph.D. Thesis, No. 18508, ETH Zürich, July 3, 2009.

DIPLOMA-/MASTER THESES

C. Aellig
Investigation of start/stop induced degradation in polymer electrolyte fuel cells with the help of potential cycling
ETH Zürich, July 2009.

F. Barthel
CO_2 splitting via the solar thermochemical cycle based on the Zn/ZnO redox reactions in a fixed bed reaction
PSI Villigen and ETH Zürich, December 2009.

F. Bruning
Comparative life cycle assessment of solar-driven and conventional production of syngas
PSI Villigen and ETH Zürich, July 2009.

N.R. Farid
Numerical investigation on the stability of propane-fuelled catalytic microreactors
PSI Villigen and ETH Zürich, February 2009.

C. Gattiker
Assessment of production and hydrothermal conversion of microalgae to synthetic natural gas for transportation
PSI Villigen and EPF Lausanne, July 2009.

M. Geiger
Determinanten einer Markteinführung der Holzgasbrennstoffzellen-Technologie - Eine Techno-Ökonomische Analyse
PSI Villigen und Universität Karlsruhe (TH), Germany, July 2009.

C.-Y. Lu
Investigation of the mechanism of graphite exfoliation in propylene and ethylene carbonate based electrolytes
Université de Picardie Jules Verne, Amiens, France, September 2009.

C. Marcel
Hydrothermal gasification of black liquor
ETH Zürich and Chalmers University of Technology, Göteborg, Sweden, July 2009.

J. Matzenberger
Hydrothermale Vergasung von Algenbiomasse - Sensitivitätsanalyse der Methangestehungskosten
PSI Villigen und Universität für Bodenkultur, Vienna, Austria, March 2009.

R. Müller
Membrane degradation in polymer electrolyte fuel cells
University of Basel, May 2009.

G. Muñoz Reyes
Catalytic hydrothermal gasification of black liquor for production of methane
PSI Villigen and Chalmers University of Technology, Göteborg, Sweden, June 2009.

A. Stamatiou
CO_2 and H_2O splitting via a solar thermochemical cycle based on Zn/ZnO redox reactions - Kinetic analysis
PSI Villigen and ETH Zürich, October 2009.

C. Villard
A fertilizer produced from sewage sludge ash: Zn speciation and uptake by plants
PSI Villigen, EPF Lausanne and ETH Zürich, July 2009.

H. Wallimann
Development and experimental investigation of a quench unit for a solar thermal ZnO-dissociation reactor
PSI Villigen and ETH Zürich, May 2009.

BACHELOR THESES

P. Edinger
Studies on the liquefaction of the microalgae P. Tricornutum and the protein BSA
PSI Villigen and ETH Zürich, July 2009.

G. Ilari
Thermodynamic and kinetic analysis of the reduction of CO_2 *and* H_2O *to syngas with the* FeO/Fe_3O_4 *redox pair*
PSI Villigen and ETH Zürich, February 2009.

D. Müller
Modellerweiterung für optimierte Abkühlung im Solarreaktor
PSI Villigen and ETH Zürich, April 2009.

SEMESTER THESES

I. Engel
Analysis for number size distributions at the Jungfraujoch
PSI Villigen and ETH Zürich, November 2009.

P. Neves
Solar-driven electrolytic production of Zn
PSI Villigen and ETH Zürich, November 2009.

B. Sethuraman
CFD simulations for determining the optimal aerodynamic window protection for a solar thermal ZnO-dissociation reactor
PSI Villigen and ETH Zürich, July 2009.

M. Weirich
Syngas production via a solar thermochemical cycle based on the FeO/Fe_3O_4 *redox reactions: Thermogravimetric analysis of the second step*
PSI Villigen and ETH Zürich, December 2009.

TALKS

Invited Talks

U. Baltensperger
Die Quellen des Feinstaubs am Beispiel des Misox
Basecamp09, Chur, June 12, 2009.

U. Baltensperger
Source apportionment and chemical features of the organic aerosol using aerosol mass spectrometers
Goldschmidt Konferenz, Davos, June 21-26, 2009.

U. Baltensperger
Recent developments in the mass spectrometry of atmospheric aerosols
IMSC 2009, Internat. Mass Spectrometry Conference, Bremen, Germany, August 30 - September 4, 2009.

U. Baltensperger
Secondary organic aerosol formation in a smog chamber and its link to the ambient atmosphere
ICAS seminar, University of Leeds, UK, February 4, 2009.

U. Baltensperger
Formation and transformation of secondary organic aerosol
Centre for Atmospheric Science seminars, University of Cambridge, UK, February 5, 2009.

U. Baltensperger
PM2.5 speciation / source apportionment
Workshop Measurements and Modelling of PM2.5 in Europe, Bilthoven, The Netherlands, April 23-24, 2009.

U. Baltensperger
Speciation / source apportionment of PM
10th Task Force on Measurement and Modeling Meeting, Paris, France, June 15-17, 2009.

U. Baltensperger
Lectures on physical and chemical aerosols characterization and impact
- Stockholm University, Sweden, November 23-25, 2009.
- IAS School, Bari, Italy, December 16, 2009.
- ERCA Course, Grenoble, France, January 12-13, 2009.

H. Ben youcef
Radiation grafted membranes for fuel cells: research highlights from Paul Scherrer Institut (PSI)
Japan Atomic Energy Agency, Takasaki, Japan, August 10-12, 2009.

S.M.A. Biollaz
Strom, Gas und Wärme aus Biomasse - Aktivitäten des PSI
GV Verein Aargauer Naturstrom (ANS), Brugg, November 12, 2009.

A. Bodi
Internal energy selected ions: thermochemical networks and unimolecular dissociation mechanisms
2009 Molecular Informatics and Bioinformatics International Symposium, Institute for Advanced Study, Collegium Budapest, Hungary, March 17–19, 2009.

A. Bodi
First results from the iPEPICO Endstation at the Swiss Light Source:
the surprisingly complex spectroscopy and dissociation dynamics of small molecules
Asilomar Conference on Mass Spectrometry, Pacific Grove CA, USA, October 16–20, 2009.

I. Czekaj
Computational screening of different catalysts by DFT modeling of the reaction mechanism of isocyanic acid hydrolysis
International Symposium on Modelling of Exhaust Gas After-Treatment, Karlsruhe, Germany, September 14-15, 2009.

I. Czekaj
Combining theory and experiments for understanding behaviour of catalyst used in energy supply and environment protection systems
Invited Lecture, HNL colloquium, Bochum, Germany, July 20, 2009.

P. Dietrich
Unterwegs zu einer nachhaltigeren individuellen Mobilität?
Bechtle Regensdorf AG, PSI Villigen, September 2009.

P. Dietrich
Energieforschung am PSI und CCEM
KTI Startup, PSI Villigen, January 13, 2009.

P. Dietrich
Unsere individuelle Mobilität - wo stehen wir?
Naturama, Aarau, May 27 2009.

P. Dietrich
Ziele des CCEM
Eröffnung des Motorenlabors an der EMPA Dübendorf, February 23, 2009.

P. Dietrich
Pathways to a more sustainable individual mobility
Energietechnikforum, Bern, September 16, 2009.

P. Dietrich
Conclusions of the IAMF 2009
IAMF, Geneva, March 2009.

P. Dietrich, N. Weidmann, T. Gül
Energy-economic analysis of changes in the transportation sector induced by climate policies
MIT, Cambridge, USA, October 22-23, 2009.

P. Dietrich, N. Weidmann,T. Gül
Energy-economic analysis of boundary conditions for introduction of FC cars
IEA-IA-Annex XIII, NREL, Denver CO, USA, October 26, 2009.

P. Dietrich
Hydrogen: Energy for the future or niche application?
Mobilis, Montbéliard, Frankreich, November 18, 2009.

P. Dietrich
Forschungsschwerpunkte im Bereich Allgemeine Energie
SIA, PSI Villigen, May 8, 2009.

P. Dietrich
Energy research and large facilities at the Paul Scherrer Institut
Vehicule du future, PSI Villigen, June 24, 2009.

P. Dietrich
Wasserstoff – ein Energieträger der Zukunft?
Rotary Club, Zurzach, November 23, 2009.

P. Dietrich
Outlook to an efficient individual mobility
PSI Summerschool 2009, PSI Villigen, July 29, 2009.

P. Dietrich
Effiziente individuelle Mobilität - Welche Rolle könnte der Strom spielen? Vision für die Schweiz
Sun21, Basel, February 20, 2009.

P. Dietrich
Elektrofahrzeuge der Zukunft – Welche Rolle spielen Batterien und Brennstoffzellen?
Vortragstagung SSM, Sursee, September 23, 2009.

J. Dommen
Analysis of secondary organic aerosols by PTR-MS
4th International Conference on Proton Transfer Reaction Mass Spectrometry and its Applications, 2009.

R. Frahm[1], M. Nachtegaal, J. Stötzel[1], M. Harfouche, J.A. Van Bokhoven[2], J.-D. Grunwaldt[3]
The dedicated QEXAFS facility at the SLS: Performance and scientific opportunities
The SRI09 - 10th international conference on synchrotron radiation instrumentation, Melbourne, Australia, September 27 - October 2, 2009.
[1] Wuppertal University, Germany
[2] Institute for Chemical and Bioengineering, ETH Zürich
[3] DTU, Copenhagen, Denmark

D. Gstöhl
Wasserstoff aus Wasser und Sonnenenergie
Technikwoche, Kantonsschule Romanshorn, May 13, 2009.

L. Gubler
New trends in hydrocarbon membrane development
Gordon Research Conference – Fuel Cells, Bryant University, Smithfield RI, USA, July 26-31, 2009.

M. Harfouche, D. Grolimund[1], C. Borca
"State-of-the-art" synchrotron-based micro-spectroscopy: case studies
IPANEMA Workshop, SOLEIL, France, May 6, 2009.

M. Harfouche, F. Farges[1]
XAFS Study of actinides in natural minerals analogues of ceramics for nuclear waste storage
European Crystallographic Meeting (ECM25), Istanbul, Turkey, August 16-21, 2009.
[1] Muséum National d'Histoire Naturelle de Paris, Paris, France

M. Johnson
Spectroscopy with synchrotron radiation and its application to thermochemistry
Colloquium: Physical and Theoretical Chemistry, Julius-Maximilian-Universität Würzburg, Deutschland, July 21, 2009.

G. Knopp
Time and frequency domain two color FWM on small (polyatomic) molecular systems
Weizmann Institute of Science, Rehovot, Israel, April 24, 2009.

R. Kötz
In-situ monitoring of EDLCs operation by physico-chemical techniques
Advanced Automotive Battery Conference AABC, Long Beach, USA, June 8-12, 2009.

R. Kötz
Single-walled carbon nanotubes and activated carbon for supercapacitor electrodes - a comparison
Keynote Lecture, 1st International Symposium on Enhanced Electrochemical Capacitors, ISEECap'09, Nantes, France, June 29 – July 2, 2009.

R. Kötz
Aging of carbon based supercapacitors
5th IUPAC International Symposium on Novel Materials and their Synthesis, Shanghai, China, October 18-22, 2009.

O. Kröcher
Chemical deactivation of vanadia-based SCR catalysts by additives and impurities from fuels, lubrication oils and urea solution
7th International Colloquium Fuels, Stuttgart/Ostfildern, Germany, January 14-15, 2009.

O. Kröcher
SCR catalyst materials for NO_x reduction
5th International CTI Forum SCR-System, Stuttgart, Germany, April 28-29, 2009.

O. Kröcher
Guanidiniumformiat-Lösung als Alternative zu AdBlue im SCR-Verfahren
7. FAD-Konferenz, Dresden, Germany, November 4-5, 2009.

O. Kröcher
Assignment of active sites in Fe-ZSM-5 and the role of Brønsted-acidity for the selective catalytic reduction of NO_x with ammonia
Seminar, Ruhr-Universität Bochum, Germany, June 24, 2009.

O. Kröcher
Combustion research at the Paul Scherrer Institute
Fachtagung SAE Schweiz, Villigen, May 14, 2009.

T. Lippert
Selected research topics of the materials group
Fraunhofer Institut Photonische Mikrosysteme, Dresden, Germany, July 2009.

T. Lippert
Laser-basierte Methoden zur Mikrostrukturierung und Abscheidung dünner Schichten: Anwendungen aus der Energieforschung
TU Ilmenau, Germany, July 2009.

T. Lippert
Thin oxide films as model systems for battery applications
French-Romanian Workshop (Atelier) on Battery Materials, Strasbourg, France, June 2009.

T. Lippert
Laser-induced forward transfer (LIFT) of OLEDs using a sacrificial layer, keynote talk at the workshop on laser processing in plastic electronics
Oxford, United Kingdom, May 2009.

T. Lippert
– *Laser interactions with materials: Thin film preparation and process monitoring*
– *Preparation and characterization of thin films*
University of Malaga, Spain, March 2009.

T. Lippert
Der Laser - vom Kuriosum zum Werkzeug: Anwendungen aus Industrie und Forschung
Seniorenforum Werdenberg, Buchs, February 2009.

T. Lippert
Laser ablation: From structuring to thin film deposition
EU meeting Fast2Light, Basel, January 2009.

P. Maire
In situ Methoden zur Untersuchung von Alterungsvorgängen in Lithiumionen-Batterien
Workshop System Analysis for Nano Enabled Electrochemical Storage Systems (SANEESS), Karlsruher Institut für Technologie (KIT), Germany, December 14, 2009.

M. Mehring
FTIR-Spektroskopie kombiniert mit Thermoanalyse zur Untersuchung von Materialien mit reaktiven und kondensierbaren Gasen
FTIR User Meeting Thermo Scientific, Seligenstadt, Germany, October 22-24, 2009.

A. Meier
Electricity and hydrogen from concentrated solar energy
Project Management Institute, Villigen PSI, April 7, 2009.

A. Meier
Sonnenenergie – Neue Technologien mit Zukunft
Ringvorlesung Stern Sonne, Volkshochschule Zürich, University of Zurich, June 4, 2009.

A. Meier
Hochtemperatur-Solartechnik – Sonnenenergie konzentrieren und speichern
Lions-Club Brugg, Untersiggenthal, September 8, 2009.

A. Meier
Towards industrial solar production of zinc and hydrogen
Swiss Research Program on Industrial High-Temperature Solar Energy (BFE), CSEM, Neuchâtel, November 3, 2009.

M. Nachtegaal
QEXAFS spectroscopy at the SuperXAS beamline
Rossendorf beamline upgrade workshop, Grenoble, France, February 23, 2009.

P. Novák
Fuel cell research & development at Paul Scherrer Institut
Investment Conference on Fuel Cell, Foreign Investment Forum 2009, Seoul, Korea, November 5, 2009.

P. Novák
Batterien und Mobilität: Von der Grundlagenforschung zum Industrieprodukt
Physikalisches Kolloquium, Physikalisches Institut der Universität Heidelberg, Germany, October 23, 2009.

P. Novák
Material development for lithium-ion batteries: Challenges and trends
Workshop on Material Science, Institute for Material Science of Mulhouse, France, October 8, 2009.

P. Novák
In situ characterization of materials for lithium-ion batteries
Seminar at Tsinghua University, Beijing, China, August 24, 2009.

P. Novák
Scientific challenges in the field of lithium-ion battery materials
Seminar at Institute of Physics, CAS, Beijing, China, August 21, 2009.

P. Novák
Battery research: A wedding of solid state electrochemistry with surface electrochemistry?
International Symposium on Frontiers of Electrochemical Science and Technology, Xi'an, China, August 13, 2009.

P. Novák
Mobilität und Elektrochemie: Wo ist der rote Faden der Batterieforschung?
Seminar der Studiengruppe Energieperspektiven, Baden, June 4, 2009.

P. Novák
Was hat Analytik mit Batterien und Mobilität gemeinsam?
Seminar NanoMat - 10. Szene „Moleküle unter Strom", Karlsruhe, Germany, March 12, 2009.

A.S.H. Prévôt
Primary and secondary organic aerosol in Europe (field studies and PSI smogchamber studies)
NCAR, Boulder, USA, August 31, 2009.

A.S.H. Prévôt
Neue Erkenntnisse über Feinstaub
Jahresversammlung Schweizerischer Kaminfegermeister-Verband (SKMV), Aarau, November 11, 2009.

G.G. Scherer
Contributions of electrochemical energy devices to a sustainable mobility
Transforming Energy Lecture, University of Maryland, A. James Clark School of Engineering, College Park, MA, USA, February 26, 2009.

G.G. Scherer
Radiation grafted fuel cell membranes
University of Maryland, Department of Materials Science and Engineering, College Park, MA, USA, February 27, 2009.

G.G. Scherer
Aspects of electrochemial energy research
Universität Bern, Seminar für Anorganische, Analytische und Physikalische Chemie, April 2, 2009.

G.G. Scherer
Brennstoffzellen und Superkondensatoren
Battery Technology Day, Technopark Zürich, May 28, 2009.

G.G. Scherer
Aspects of materials development for polymer electrolyte fuel cells
E-MRS, Symposium C, Strasbourg, France, June 15-19, 2009.

G.G. Scherer
Insights into the water management problem of PEFCs provided by neutron imaging
International Symposium on Diagnostic Tools for Fuel Cell Technologies, Technical University of Trondheim, Norway, June 23-24, 2009.

G.G. Scherer
Brennstoffzellentechnologien - Gemeinsamkeiten und Unterschiede
„Von Anfang bis Zukunft: Die Brennstoffzelle schreibt Geschichte“
Max-Planck-Institut für Polymerforschung, Mainz, Germany, July 9, 2009.

G.G. Scherer
Brennstoffzellentechnologien im Spannungsfeld zwischen Wunsch und Wirklichkeit
Physikalisches Kolloquium, Universität Konstanz, Germany, July 21, 2009.

G.G. Scherer
Novel proton-conducting polymer membranes
60th Annual Meeting of the International Society of Electrochemistry, Beijing, China, August 16–21, 2009.

G.G. Scherer
Aktuelle Themen der Materialforschung für die elektrochemische Energiewandlung und –speicherung
Werkstoffwissenschaftliches Kolloquium, Universität Erlangen-Nürnberg, Germany, December 1, 2009.

G.G. Scherer
Solid polymer electrolytes for electrochemical systems prepared by radiation grafting
Polymer Science and Technology: Vision & Scenario, APA 2009, New Dehli, India, December 16-20, 2009.

T.J. Schildhauer
Verlängerung der Wertschöpfungskette Holz – ein Bulletin aus der Forschung
5. Tagung Automatische Holzfeuerung, Berner Fachhochschule Biel, February 26, 2009.

C.W. Schneider
Highly mobile electron-gases formed at interfaces in oxide heterostructures
Materialphysikalisches Seminar des Instituts für Materialphysik, Göttingen University, Germany, January 22, 2009.

I.A. Schneider
Current distribution and impedance response in polymer electrolyte fuel cells
215th Meeting of The Electrochemical Society, San Francisco CA, USA, May 25, 2009.

M. Schubert, J. Müller, F. Vogel
Salt separation and recovery from supercritical water
Bio-SNG’09, Int. Conference on advanced biomass-to-SNG technologies and their market implementation, Zürich, May 26-27, 2009.

O.V. Sidorova
Climatic changes on the Eurasian north inferred from stable isotopes in tree rings
Krasnoyarsk, Government of the Krasoyarsk Krai, Russia, June 3, 2009.

O.V. Sidorova
Stable isotopes in tree rings as indicators of climatic and environmental changes in high-latitude and -altitude regions
ETH Zürich, December 7, 2009.

A. Steinfeld
Solar fuels – thermochemical processes & reactor technology
- The Caltech Center for Sustainable Energy Research, Caltech, Pasadena, USA, January 14, 2009.
- AIChE Annual Meeting, Nashville, November 12, 2009.

A. Steinfeld
Solar fuels
Eilat Energy Conference, Israel, February 17, 2009.

A. Steinfeld
Renewable energy technologies
Università della Svizzera Italiana, Lugano, May 18, 2009.

A. Steinfeld
Solar thermochemical production of fuels for CO_2 mitigation
Ohio State University, Columbus, USA, June 5, 2009.

A. Steinfeld
Fuels from sunlight, water, and CO_2
- Keynote at the ASME 3rd International Conference on Energy Sustainability, San Francisco, USA, July 22, 2009.
- UCLA Thermo-fluids Research Seminar Series, Los Angeles, USA, October 16, 2009.

A. Steinfeld
Solar fuels and materials
University of Delaware, Newark, USA, August 12, 2009.

S. Ulli-Beer; M. Bosshardt, P. Dietrich, A. Wokaun
Wie können wir in ferner Zukunft wieder mit gutem Gewissen Auto fahren?
Auto Basel, September 18, 2009.

S. Ulli-Beer
Diffusionsdynamik energieeffizienter Bauten: Ergebnisse
Mitgliederversammlung IG Passivhaus, Zürich, March 30, 2009.

F. Vogel
Neue Technologien zur Erzeugung biogener Gase – Methan aus Holz und Hydrothermale Vergasung nasser Biomasse
4. Frühjahrstreffen der Betreiber von Biogasanlagen, Kleindöttingen, March 20, 2009.

F. Vogel
PSI's catalytic hydrothermal gasification process
Bio-SNG '09, Int. conference on advanced biomass-to-SNG technologies and their market implementation, Zürich, May 27, 2009.

F. Vogel
SunCHem – Recent results on the hydrothermal conversion of algae to bio-methane
17th European Biomass Conference & Exhibition (plenary lecture), Hamburg, Germany, June 30, 2009.

F. Vogel
Hydrothermale katalytische Vergasung von Biomasse – eine Übersicht
Fachgespräch "Hydrothermale Verfahren zur Nutzung von nachwachsenden Rohstoffen"
Forschungszentrum Karlsruhe, Germany, organized by Fachagentur Nachwachsende Rohstoffe, September 2, 2009.

E. Weingartner
Kleine Teilchen mit grosser Wirkung
Physikalisch-Technische Bundesanstalt, Braunschweig, Germany, November 24, 2009.

A. Wokaun
Energy related catalysis
Winter School, Advanced Course on Catalysis, EPFL, Villars-sur-Ollon, February 6, 2009.

A. Wokaun
Visionäre Energiebereitstellung
Europa Forum Luzern, April 28, 2009.

A. Wokaun
Die Bedeutung von Klimazielen auf dem Weg zu einer Niedrigenergie-Gesellschaft
NCCR Climate, Abschlusskonferenz: Variabilität, Vorhersagbarkeit und Risiken des Klimas, Bern, June 12, 2009.

A. Wokaun
How to remain mobile in a world of dwindling supplies
PSI Summer School 2009, Zuoz, August 3, 2009.

A. Wokaun
Welche Energieträger decken den grössten Energiebedarfsanteil?
Welche Perspektiven für einen Ersatz fossiler Energieträger in der Schweiz?
Forum Vera, Tagung 'Energiepolitik – Auswege aus dem Dilemma?', Böttstein, September 10, 2009.

A. Wokaun
Übersicht: Potential der erneuerbaren Energien in der Schweiz
EMPA Akademie, Technologie-Briefing "Das Potenzial für erneuerbare Energien in der Schweiz" Dübendorf, November 9, 2009.

A. Wokaun
Globale und nationale Potentiale der erneuerbaren Energien
SAEE Jahrestagung 2009, ETH Zürich, November 11, 2009.

Contributions to Media

U. Baltensperger
Understanding the nature of air pollution
Journal: Projects Magazine ESF, July, 2009.

U. Baltensperger, A.S.H. Prévôt
Wie Feinstaub erst in der Luft entsteht
Zeitungsbericht: Die Botschaft, December 12, 2009.

U. Baltensperger, A.S.H. Prévôt
Wie Feinstaub entsteht
Radiobericht: Science ORF AT, December 11, 2009.

U. Baltensperger, A.S.H. Prévôt
Umwandlung in der Atmosphäre. Wie Feinstaub wirklich entsteht
Zeitungsbericht: Spiegel online, December 11, 2009.

U. Baltensperger, A.S.H. Prévôt
Feinstaub entsteht erst in der Atmosphäre
Zeitungsbericht: Stern online, December 10, 2009.

U. Baltensperger, A.S.H. Prévôt
Rätsel um Feinstaub gelöst
Zeitungsbericht: CHEMIE. DE, December 15, 2009.

M.F. Heringa, P.F. DeCarlo, R. Chirico, T. Tritscher, A.S.H. Prévôt, U. Baltensperger
Dreckschleuder Cheminée verursacht zu viel giftigen Feinstaub
Fernsehbericht: SF1, 10vor10, March 3, 2009.

J.-L. Jimenez, A.S.H. Prévôt
A model of aerosol aging
Journal: Chemical Engineering News, December 14, 2009.

J. Keller
Interview: Einfluss von Tempo 80 auf die Luftqualität
Radiobericht: Radio Argovia, September 14, 2009.

Ch. Ludwig
Methan aus Algen als Treibstoff für das Auto - Unter heissem Hochdruck wird Biomasse zu Biogas
TV-Beitrag, 3Sat, Sendung NANO, November 25, 2009.

C. Mohr, M.F. Heringa, R. Richter
Interaccions en la contaminació de l'aire
Fernsehbericht: TV3, Barcelona, Spain, May 18, 2009.

A.S.H. Prévôt, U. Baltensperger
Wer am Auspuff misst, misst falsch
Zeitungsbericht: 20 Minuten, December 11, 2009.

A.S.H. Prévôt, U. Baltensperger
Auch Filets machen Feinstaub
Zeitungsbericht: Aargauer Zeitung, December 11, 2009.

A.S.H. Prévôt, U. Baltensperger
Rätsel geknackt: Wie Feinstaub erst in der Luft entsteht
- Journal: Technica online, December 10
- Journal: Schattenblick - Luft, December 10
- Journal: analytica-world.com, December 12
- PSI Pressemitteilungl: Informationsdienst Wissenschaft, December 10.
- Report: Innovations-report.de, December 11, 2009.

A.S.H. Prévôt, C. Bauer, U. Baltensperger
Feinstaub - zahlreiche Quellen und vielseitige Auswirkungen
Journal: FME NEWS, Forum Medizin und Energie, October, 2009.

Solar Technology Laboratory
Sunlight in your tank
Journal: doi: 10.1126/science.326.5959.1472, Science **326**, 1472-1475 (2009).

Solar Technology Laboratory
Existing gas power plants could pump out hydrogen
New Scientist, May 12, 2009.

Solar Technology Laboratory
Put some sunlight in your tank
Caltech’s Engineering & Science Magazine, 21-26, Fall 2009.

Solar Technology Laboratory
Vom Abfall zum Chemierohstoff
Neue Zürcher Zeitung, 69, September 23, 2009.

Solar Technology Laboratory
Die Sonne im Tank
Newsletter des Energy Science Center der ETH Zürich, Nr. 10, 2, 2009.

S. Stucki, S.M.A. Biollaz
Synthetisches Erdgas aus Schweizer Holz - aus schmutzigem Holz wird sauberes Erdgas
Radio-Beitrag, DRS2, February 7, 2009.

A. Wokaun
Nachhaltige Mobilität als ein Pfeiler des CCEM-CH
Departement für Wirtschaft, Soziales und Umwelt Basel-Stadt, Übergabe des wasserstoffbetriebenen Kehrfahrzeuges "hy.muve" an die Stadt Basel, May 14, 2009.

A. Wokaun
Nachdenken über die Energieversorgung von morgen
Interview für Investment Magazin "ahead", Clariden Leu, 3, 2009.

Other Talks

E.M.C. Alayon[1], J. Singh[1], M. Nachtegaal, M. Harfouche, J.A. van Bokhoven[1]
In situ XAS probes partially oxidized platinum generating high activity for CO oxidation
XAFS14 Conference, Camerino, Italy, July 26-31, 2009.
[1] ETH Zürich

S. Andreani-Aksoyoglu
Application of CAMx model in Switzerland with the new SOA mechanism
NATO/SPS ITM Air Pollution Modelling and its Application, San Francisco, USA, May 18, 2009.

S. Andreani-Aksoyoğlu
Modelling of air quality and sensitivity studies in June 2006 in Switzerland
ACCENT/GLOREAM Workshop, Brescia, Italy, November 26, 2009.

S. Andreani-Aksoyoglu, J. Keller, D. Oderbolz, I. Barmpadimos, A.S.H. Prévôt, U. Baltensperger
Modelling of aerosol composition in Switzerland: Seasonal and annual variability
Air Quality - Science and Application, Istanbul, Turkey, March 24-27, 2009.

M. Arhami, M.C. Minguillón, A. Polidori, R.J. Delfino, J.J. Schauer, C. Sioutas
Organic compound characterization and source apportionment of indoor and outdoor quasi-ultrafine PM in retirement homes of the Los Angeles basin
American Association for Aerosol Research (AAAR) Annual Conference 2009, Minneapolis, USA, October 26-30, 2009.

S. Balog, U. Gasser, K. Mortensen[1], L. Gubler, H. Ben youcef, G.G. Scherer
Correlation between morphology, water uptake, and proton conductivity in radiation grafted proton exchange membranes
437. WE-Heraeus-Seminar, ‘Photons and Neutrons as Probes of Matter’, Physikzentrum Bad Honnef, Germany, December 13–16, 2009.
[1] University of Copenhagen, Frederiksberg, Denmark

U. Baltensperger
CLOUD: The influence of cosmic rays on clouds and climate
2009 CHIPP Plenary Meeting, Appenberg, August 24-25, 2009.

U. Baltensperger, E. Weingartner, M. Gysel, Z. Juranyi, W. G., R. Schmidhauser, L. Kammermann
The GAW-CH Aerosol program
GAW CH Ausschuss-Sitzung, Zürich, April 9, 2009.

I. Barmpadimos, J. Keller, M. Deserti, E. Minguzzi, R. San Jose, J.L. Pérezc, S. Andreani-Aksoyoglu, D. Oderbolz, A.S.H. Prévôt
Model evaluation and inter-comparison study in Po Basin
ACCENT/GLOREAM Workshop on tropospheric chemical transport modelling, Brescia, Italy, November 26-27, 2009.

M.H. Bayer, A. Wokaun, G.G. Scherer, I.A. Schneider
Dynamic measurement and modeling of the water vapor concentration during ac impedance measurements in polymer electrolyte fuel cells (PEFCs)
216th Meeting of the Electrochemical Society, Vienna, Austria, October 4-9, 2009.

J. Bernard, S. Delprat[1], T.M. Guerra[1], P. Dietrich, F.N. Büchi
Energy efficient power management strategy for fuel cell hybrid vehicles
International Advanced Mobility Forum, Geneva, March 10-12, 2009.
[1] Université de Valenciennes et du Hainaut-Cambrésis, France

S.M.A. Biollaz, T.J. Schildhauer, D. Ulrich[1], H. Tremmel[2], R. Rauch[3], M. Koch[4]
Status Report of the Demonstration of BioSNG Production on a 1 MW Scale in Güssing
17th European Biomass Conference and Exhibition, Hamburg, Germany, June 29 - July 3, 2009.
[1] CTU Winterthur
[2] repotec Wien, Austria
[3] TU Wien, Austria
[4] Biomassekraftwerk Güssing, Germany

S.M.A. Biollaz, P. Hottinger, Ch. Pitta, J. Karl[1]
Results from a 1200 Hour Test of a Tubular SOFC with Woodgas
17th European Biomass Conference and Exhibition, Hamburg, Germany, June 29 - July 3, 2009.
[1] Graz University of Technology, Austria

P. Boillat, P. Oberholzer, G.G. Scherer, A. Wokaun, E.H. Lehmann
A study of water distribution transients in PEFC using time resolved high resolution neutron imaging
6th Symposium on Fuel Cell Modelling and Experimental Validation (MODVAL 6), Bad Herrenalb, Germany, March 25-26, 2009.

P. Boillat, P. Oberholzer, G.G. Scherer, A. Wokaun, E.H. Lehmann
Study of water dynamics in PEFC porous media using time resolved high resolution neutron imaging
ASME 7th International Fuel Cell Science, Engineering & Technology Conference, Newport Beach, USA, June 8-10, 2009.

P. Boillat, R. Flückiger, J. Eller, P. Oberholzer, G. Frei, A. Kästner, M. Stampanoni, R. Perego, E.H. Lehmann, F.N. Büchi, G.G. Scherer, A. Wokaun
Tracking water in fuel cells using PSI large research facilities
JUM@P'09 – Joint Users Meeting at PSI, Villigen, October 12-13, 2009.

P. Boillat
Looking in a fuel cell: X-ray and neutron tomography and radiography
8th PSI Summer School on Condensed Matter Research, Zuoz, August 2-7, 2009.

M. Bouza, S. Ulli-Beer, A. Wokaun
Technological Transformation Patterns
MIT-PSI Workshop AGS, MIT Boston, USA, October 21–22, 2009.

S. Brandenberger, O. Kröcher, A. Tissler[1], R. Althoff[1]
Assignment of active sites in Fe-ZSM-5 for the selective catalytic reduction of NO_x with ammonia by catalytic tests and statistical considerations
42. Jahrestreffen Deutscher Katalytiker, Weimar, Germany, March 11-13, 2009.
[1] Süd-Chemie AG, Bruckmühl, Germany

F.N. Büchi, J. Eller, R. Flückiger, F. Marone, M.Stampanoni
Investigation of solid-liquid interactions in porous transport layers using X-ray micro tomography
216th Meeting of the Electrochemical Society, Vienna, Austria, October 4-9, 2009.

F.N. Büchi, T. Colinart
Sub-millimeter current density distribution in PEFC at sub-zero temperatures
216th Meeting of the Electrochemical Society, Vienna, Austria, October 4-9, 2009.

F.N Büchi, R. Flückiger, M. Reum, F. Marone, M. Stampanoni
Contribution to the understanding of the heterogenieties on the channel/rib scale in PEFC
6th Symposium on Fuel Cell Modelling and Experimental Validation (MODVAL 6), Bad Herrenalb, Germany, March 25-26, 2009.

D. Cericola, P.W. Ruch, P. Novák, R. Kötz, A. Wokaun
Approach to bi-material electrodes for electrochemical double layer capacitor – Li-ion battery hybrids
216th Meeting of the Electrochemical Society, Vienna, Austria, October 4-9, 2009.

S.S. Chikatamarla[1], I.V. Karlin[1], S. Arcidiacono, N.I. Prasianakis, E. Chiavazzo[1], K. Boulouchos[1]
Lattice Boltzmann simulation of reactive flows with applications to combustion
Combustion research in Zurich, October 28, 2009.
[1] ETH Zürich

R. Chirico, P.F. DeCarlo, M.F. Heringa, T. Tritscher, A.S.H. Prévôt, E. Weingartner, J. Dommen, U. Baltensperger
Primary organic aerosol and secondary aerosol formation potential from a Euro 3 diesel passenger car
13th ETH-Conference on Combustion Generated Nanoparticles, ETH Zürich, June 22-24, 2009.

R. Chirico, P.F. DeCarlo, M.F. Heringa, T. Tritscher, A.S.H. Prévôt, E. Weingartner, J. Dommen, U. Baltensperger
Direct emissions of primary organic aerosol and secondary aerosol formation potentia of a euro 3 diesel car during smog chamber experiments
ETTAP Symposium, Toulouse, France, June 4, 2009.

J.-F. Colin, V. Godbole, P. Novák
In situ neutron diffraction study of $Li_4Ti_5O_{12}$
42nd IUPAC Congress - Chemistry Solutions, Glasgow, United Kingdom, August 2-7, 2009.

I. Czekaj
Urea-SCR: Comparison of DFT calculations and experimental results on the catalytic hydrolysis of isocyanic acid (HNCO)
8th International Congress on Catalysis and Automotive Pollution Control, Brussels, Belgium, April 15-17, 2009.

S. Daniele
Lean premixed syngas combustion: Operational window and turbulent flame speed
- 24. Deutscher Flammentag, Bochum, Germany, September 16-17, 2009.
- Verbrennung in die Schweiz, Zürich, October 28, 2009.

S.M. Dockheer[1], W.H. Koppenol[1], L. Gubler
Oxidation mechanism of oligomer model compounds for polymer electrolyte fuel cell membranes
26th "MILLER" Conference on Radiation Chemistry, Keszthely, Hungary, August 28 - September 2, 2009.
[1] ETH Zürich

A. Foelske-Schmitz, A. Savouchkina, R. Kötz, G.G. Scherer, A. Wokaun
Electrochemical platinum deposition on modified glassy carbon electrodes
216th Meeting of the Electrochemical Society, Vienna, Austria, October 4-9, 2009.

M. Furger
Extremwetter und Klimawandel
Villigen PSI, VHS Region Zurzach, March 11 and 18, 2009.

T. Gerber
Studies of Ter-Butyl-Peroxy and Hexadiyne by dispersed fs-FWM methods
7th International Symposium Towards Clean Diesel Engines, Aachen, Germany, June 4-5, 2009.

T. Gerber
Swiss Light Source VUV beamline, Imaging photoelectron photoion coincidence spectroscopy
7th International Symposium Towards Clean Diesel Engines, Aachen, Germany, June 4-5, 2009.

J. Gomez-Cámer[1], J. Morales[1], L. Sanchez[1], P. Ruch, S.H. Ng, R. Kötz, P. Novák
Nanosized Si/cellulose fiber/carbon composites as high capacity anodes for lithium-ion batteries: A galvanostatic and dilatometric study
216th Meeting of the Electrochemical Society, Vienna, Austria, October 4-9, 2009.
[1] Universidad de Córdoba, Spain

D. Gstoehl
Solar thermal dissociation of ZnO – reactor modeling and optimization for scale-up
15th SolarPACES Conference, Berlin, Germany, September 15-18, 2009.

L. Gubler, N. Linse, A. Wokaun, G.G. Scherer
Start/stop induced degradation in polymer electrolyte fuel cells and mitigation strategies
60th Annual Meeting of the International Society of Electrochemistry, Beijing, China, August 16-21, 2009.

M. Gysel, T. Tritscher, M.F. Heringa, R. Chirico, P.F. DeCarlo, J. Noda, T. Gustafsson, J.B.C. Pettersson, J. Dommen, E. Weingartner, A.S.H. Prévôt, U. Baltensperger
Is black carbon internally or externally mixed? An experimental answer from recent laboratory and field experiments
13th ETH Conference on Combustion Generated Nanoparticles, Zürich, June 22, 2009.

M. Gysel, T. Tritscher, M.F. Heringa, P.F. DeCarlo, J. Noda, T. Gustafsson, J.B.C. Pettersson, J. Dommen, E. Weingartner, A.S.H. Prévôt, U. Baltensperger
Probing the composition, mixing state and hygroscopic properties of aerosol particles emitted from a wood pellet burner by coupling a SP2 and a SI-AMS with a H-TDMA
EAC, Karlsruhe, Germany, September 11, 2009.

S. Heiroth, T. Lippert, A. Wokaun
Microstructural engineering of functional electroceramic coatings by laser ablation
SPERU Annual Science Day, Zürich, October 2009.

S. Heiroth, T.Lippert, A. Wokaun, J. Koch, D. Günther, F. Garrelie, M. Guillermin
Laser ablation of zirconia-based ceramics in the ns- and fs-regime: Origin and elimination of target fragmentation
E-MRS Spring Meeting 2009, Strasbourg, France, June 2009.

M.F. Heringa, P.F. DeCarlo, R. Chirico, A.C.J. Richard, A. Lauber, A. Doberer, J. Good, T. Nussbaumer, A. Keller, N. Meyer, H. Burtscher, B. Miljevic, A.S.H. Prévôt, U. Baltensperger
Emission measurements from a pellet boiler and log wood burner
IMBALANCE meeting, ETH Zürich, May 27, 2009.

M.F. Heringa, P.F. DeCarlo, R. Chirico, T. Tritscher, A.S.H. Prévôt, U. Baltensperger
Investigation of primary and secondary organic aerosols from wood combustion with a high resolution time of flight aerosol mass spectrometer
13th ETH Conference on Combustion Generated Nanoparticles, Zürich, June 23, 2009.

M.F. Heringa, P.F. DeCarlo, R. Chirico, T. Tritscher, A.S.H. Prévôt, U. Baltensperger
Investigations of primary and photo-oxidation products of wood combustion with a high-resolution time-of-flight aerosol mass spectrometer
AAAR, 28th Annual Conference, Minneapolis, USA, October 27, 2009.

P. Jansohn
Investigations about co-firing of gasified herbaceous biomass in an Integrated Gasification Combined Cycle
16th IFRF Members Conference, Boston MA, USA, June 8-10, 2009.

P. Jansohn
(Co-)Firing of biomass derived hydrogen rich syngas in gas turbines
International Energy Agency (IEA), Implementing Agreement on Energy Conservation and Emission Reduction in Combustion. 31st Task Leaders Meeting, Lake Louise, Canada, September 21-24, 2009.

P. Jansohn
H2IGCC - Low Emission Gas Turbine Technology for Hydrogen-rich Syngas
Annual General Meeting, European Turbine Network (ETN), Edinburgh, UK, April 22-23, 2009.

J. Judex, S. Daniele, J.-L. Hersener[1], S.M.A. Biollaz, P. Jansohn, T.J. Schildhauer
Investigations about cofiring of herbaceous biomass in an integrated gasification combined cycle
4th International Conference on clean Coal Technologies/3rd International Freiberg Conference on IGCC and XtL, Dresden, Germany, May 18-21, 2009.
[1] Ingenieurbüro Hersener, Wiesendangen

A. Keller, A. Lauber, A. Doberer, J. Good, T. Nussbaumer, A. Richards, M.F. Heringa, R. Chirico, P.F. DeCarlo, A.S.H. Prévôt, U. Baltensperger, H. Burtscher
The case of on-line measurements vs. gravimetric sampling for quantifying the particulate emissions from biomass combustion
EAC, Karlsruhe, Germany, September 6-11, 2009.

A. Keller, N.K. Meyer, M. Sattler, C. Gaegauf, A. Lauber, A. Doberer, J. Good, T. Nussbaumer, M.F. Heringa, P.F. DeCarlo, R. Chirico, A. Richard, A.S.H. Prévôt, U. Baltensperger, H. Burtscher
Quantifying wood combustion emissions with on-line methods
13th ETH Conference on Combustion Generated Nanoparticles, Zürich, June 23, 2009.

J. Keller, I. Barmpadimos, S. Andreani-Aksoyoglu, D. Oderbolz, A.S.H. Prévôt
Performance of the meteorological model MM5 during the air quality simulation episodes January/February 2006, June 2006 and January 2007
Air Quality - Science and Application, Istanbul, Turkey, March 24-27, 2009.

E. Kleimenov, A. Bergamaschi, J. van Bokhoven[1], M. Janousch, B. Schmitt, M. Nachtegaal
High-resolution hard-X-ray fluorescence spectrometer
XAFS14 Conference, Camerino, Italy, July 26-31, 2009.
[1] ETH Zürich

G. Knopp
Monitoring the molecular dynamics of ro-vibrational manifolds in the A^1A_2 sate of H2CO by fs- TCFWM
European Conference on Nonlinear Optics and Spectroscopy (ECONOS), Frascati, Italy, Mai 24-27, 2009.

A. Kress, M. Saurer, R.T.W. Siegwolf, D.C. Frank, J. Esper, H. Bugmann
Europe's first Carbon-Isotope based Drought Reconstruction
Eurodendro 2009, Mallorca, Spain, October 26-30, 2009.

F. La Mantia, S.H. Ng, P. Novák
A cell with multiple working electrodes: measuring the perpendicular current density distribution.
215th Meeting of the Electrochemical Society, San Francisco, California, USA, May 24-29, 2009.

N. Linse, C. Aellig, A. Wokaun, G.G. Scherer, L. Gubler
Influence of operating parameters on start/stop induced degradation in polymer electrolyte fuel cells
216th Meeting of the Electrochemical Society, Vienna, Austria, October 4-9, 2009.

T. Lippert, S. Heiroth, A. Wokaun
Pulsed laser deposition of electroceramic thin films for a micro solid oxide fuel cell
10th International Conference on Laser Ablation (COLA), Singapore, November 2009.

T. Lippert, A. Wokaun, J. Shaw-Stewart, M. Nagel, F. Nüesch
Transfer of a single light-emitting polymer layer using laser induced forward transfer
10th International Conference on Laser Ablation (COLA), Singapore, November 2009.

P. Maire, W. Scheifele, H. Kaiser, P. Novák
Colorimetric determination of lithium ion diffusion in graphite electrodes
Lithium Battery Discussion - Electrode Materials, Arcachon, France, September 20-25, 2009.

A. Meier
Hochtemperatur-Solartechnik – Technologien der Zukunft
AMI-Kolloquium, Villigen PSI, August 26, 2009.

M.M. Menamparambath, A. Wokaun, G.G. Scherer, L. Gubler
Insights into the local degradation of chemically aged radiation grafted membranes
European Fuel Cell Forum 2009, Luzern, June 29 – July 2, 2009.

B. Miljevic, M.F. Heringa, A. Keller, N.K. Meyer, J. Good, A. Doberer, A. Lauber, A. Richard, P.F. DeCarlo, T. Nussbaumer, H. Burtscher, A.S.H. Prévôt, K.E. Fairfull-Smith, U. Baltensperger, S.E.Bottle, Z.D. Ristovski
Oxidative potential of log wood and pellet burning particles assessed by a novel profluorescent nitroxide probe
EAC, Karlsruhe, Germany, September 8, 2009.

M.C. Minguillón, X. Querol, E. Monfort, A. Alastuey, A. Escrig, I. Celades, J.V. Miró
Reduction of PM emissions from specific sources reflected on key components concentrations of ambient PM_{10}
Geophysical Research Abstracts, EGU, April 19-24, 2009.

C. Mohr, R. Richter, P.F. DeCarlo, R. Chirico, M.F. Heringa, V.A. Lanz, A.S.H. Prévôt, U. Baltensperger
Investigation of sources of ambient submicron aerosol in the Zurich metropolitan area using AMS mobile and stationary data
AAAR 28th Annual Meeting, Minneapolis, MA, USA, October 30, 2009.

C. Mohr, S. Weimer, R. Richter, P.F. DeCarlo, R. Chirico, M.F. Heringa, V.A. Lanz, A.S.H. Prévôt, U. Baltensperger
Investigation of sources of ambient submicron aerosol using AMS mobile and stationary data
Nanoparticle Conference, ETH Zürich, June 22, 2009.

C. Mohr, S. Weimer, R. Richter, P.F. DeCarlo, R. Chirico, M.F. Heringa, V.A. Lanz, A.S.H. Prévôt, U. Baltensperger
Source apportionment of ambient aerosol applying PMF on AMS mobile data
IMBALANCE Meeting, ETH Zürich, May 27, 2009.

P. Novák, P. Maire
Diffusion kinetics of lithium-ions in graphite composite electrodes for lithium-ion batteries
60th Meeting of the International Society of Electrochemistry, Beijing, China, August 16-21, 2009.

D.C. Oderbolz
Do you use your computer effectively?
EMPA Dübendorf, November 19, 2009.

D.C. Oderbolz, S. Andreani-Aksoyoglu, J. Keller, I. Barmpadimos, A.S.H. Prévôt, U. Baltensperger
Improvement of a biogenic emission inventory for air quality modelling in Switzerland
EAC, Karlsruhe, Germany, September 6-11, 2009.

D.C. Oderbolz, S. Andreani-Aksoyoglu, J. Keller, I. Barmpadimos, A.S.H. Prévôt, U. Baltensperger
Effect of biogenic emissions on air quality modelling in Switzerland
ACCENT/GLOREAM Workshop, Brescia, Italy, November 27, 2009.

N.I. Prasianakis, I. Mantzaras
Lattice Boltzmann microflow simulation for fuel cell systems
4th Swiss Lattice Boltzmann meeting, Zürich, December 2, 2009.

N.I. Prasianakis, I.V. Karlin[1], I. Mantzaras
Lattice Boltzmann method with restored Galilean invariance, rotational isotropy and reference temperature independence
18th Discrete Simulation of Fluid Dynamics conference, Beijing, China, July 6-10, 2009.
[1] ETH Zürich

A.S.H. Prévôt
Source apportionment of combustion of ambient aerosol applying PMF on AMS mobile and stationary measurements
EGU, Vienna, Austria, April 19-24, 2009.

A.S.H. Prévôt
Fossil and non-fossil primary and secondary organic aerosol
Goldschmidt Conference, Davos, June 21-26, 2009.

A.S.H. Prévôt
Assessment of fossil and non-fossil primary and secondary organic aerosol
EAC, Karlsruhe Germany, September 6-11, 2009.

A.S.H. Prévôt
Aerosol mass spectrometry measurements during the EMEP and other recent campaigns in Europe
Convention on long-range transboundary air pollution, Task Force on Measurement and Modelling Workshop, Ispra, Italy, November 19-20, 2009.

A.S.H. Prévôt
Aging of diesel and wood burning soot in smogchamber experiments
American Geophysical Union, San Francisco, USA, December 13-18, 2009.

A.S.H. Prévôt
Assessment of fossil and non-fossil primary and secondary organic aerosol with measurements and existing 3-D models for Central Europe
International aerosol modeling algorithms conference, UC Davis, USA, December 9-11 2009.

P.P. Radi
Highly sensitive double-resonance spectroscopy of transient molecules in a free-jet by four-wave mixing spectroscopy
European Conference on Nonlinear Optical Spectroscopy (ECONOS), Frascati, Italy, May 25-27, 2009.

A. Richard, M. Furger, N. Bukowiecki, P. Lienemann, M. Nachtegaal, A.S.H. Prévôt and U. Baltensperger
Source apportionment studies for trace elements based on hourly size-segregated data
EAC, Karlsruhe, Germany, September 6-11, 2009.

C. Roquier[1], S. Regenspurg[1,2], M. Harfouche, P. Froidevaux[3], P. Steinmann[4], P. Junier[1], R. Bernier-Latmai[1]
Binding of uranium to organic-rich soils in an alpine region in Switzerland
Goldschmidt Conference, Davos, June 22-26, 2009.
[1] EPF Lausanne
[2] Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Germany
[3] University of Lausanne, IURA, Lausanne
[4] Swiss Federal Office of Public Health, BAG Bern

A. Savouchkina, A. Foelske-Schmitz, R. Kötz, G.G. Scherer, A. Wokaun, J. Ziegler, C. Padeste, V. Auzelyte, H.H. Solak
Extreme ultraviolet interference lithography for production of Pt nanoparticles on glassy carbon
216th Meeting of the Electrochemical Society, Vienna, Austria, October 4-9, 2009.

G.G. Scherer
Brennstoffzellen - Energiequellen der Zukunft?
Lions Club Brugg/AG und Lions Club Bad Herrenalb, Germany, Paul Scherrer Institut, June 13, 2009.

T.J. Schildhauer, S.M.A. Biollaz
Fluidized bed methanation technology for improved production of SNG from coal
4th International Conference on Clean Coal Technologies/3rd International Freiberg Conference on IGCC and XtL, Dresden, Germany, May 18-21, 2009.

T.J. Schildhauer, J. Kopyscinski, S.M.A. Biollaz
Fluidized bed methanation for producing synthetic natural gas from biomass
8th World Congress of Chemical Engineering/ 7th International Symposium on Catalysis in Multiphase Reactors (Camure-7), Montréal, Canada, August 23-27, 2009.

T.J. Schildhauer, R.P.W.J. Struis, S.M.A. Biollaz
Catalyst deactivation during methanation of biomass derived syngas for the production of synthetic natural gas (SNG)
International Symposium on Catalyst Deactivation, Delft, The Netherlands, October 25-28, 2009.

C.W. Schneider
The Josephson effect, a tool to investigate the superconducting order parameter symmetry
Solid State Physics Seminar, ETH Hönggerberg, Zürich, November 2009.

I.A. Schneider, M.H. Bayer, A. Wokaun, G.G. Scherer
Negative resistance values in locally resolved impedance spectra of polymer electrolyte fuel cells
216th Meeting of the Electrochemical Society, Vienna, Austria, October 16, 2009.

I.A. Schneider, M.H. Bayer, A. Wokaun, G.G. Scherer
Negative resistance values in locally resolved impedance spectra of polymer electrolyte fuel cells
International Workshop on Impedance Spectroscopy, Chemnitz, Germany, October 29, 2009.

G.A. Schuler, A. Wokaun, F.N. Büchi
Local online gas analysis in PEFC
International Symposium on Diagnostic Tools for Fuel Cell Technologies, Trondheim, Norway, June 23-24, 2009.

G.A. Schuler, A. Wokaun, F.N. Büchi
Experimental investigation of the local membrane permeation characteristics in PEFC
European Fuel Cell Forum, Luzern, June 29 - July 2, 2009.

H. Schulenburg, E. Müller[1], G. Khelashvili[2], T. Roser, H. Bönnemann[2], A. Wokaun, G.G. Scherer
Heat-treated $PtCo_3$ nanoparticles as oxygen reduction catalysts
7th Spring Meeting of the International Society of Electrochemistry, Szczyrk, Poland, March 22-25, 2009.
[1] ETH Zürich
[2] Forschungszentrum Karlsruhe, Germany

H. Schulenburg, B. Schwanitz, A. Wokaun, G.G. Scherer
Pt-based catalysts for Polymer Electrolyte Fuel Cells
Electrochemical Nanoscience Seminar, Universität Bern, July 1, 2009.

B. Schwanitz, H. Schulenburg, A. Wokaun, G. G. Scherer
Ultra low Pt anodes for polymer electrolyte fuel cells
European Fuel Cell Forum 2009, Luzern, June 29 - July 2, 2009.

B. Seyfang, P. Boillat, G.G. Scherer, T. Lippert, A. Wokaun
Miniaturized polymer electrolyte fuel cell without gas diffusion layers
European Fuel Cell Forum 2009, Luzern, June 29 - July 2, 2009.

B. Seyfang, P. Boillat, G.G. Scherer, T. Lippert, A. Wokaun
Foregoing the gas diffusion layers in miniaturized polymer electrolyte fuel cells: Losses and profits
6th Symposium on Fuel Cell Modelling and Experimental Validation (MODVAL 6), Bad Herrenalb, Germany, March 25-26, 2009.

O.V. Sidorova, R.T.W. Siegwolf, M. Saurer, T. Boettger, E.A. Vaganov
$\delta^{13}C$ and $\delta^{18}O$ in Siberian tree rings as indicators of environmental changes in the Eurasian north
EGU, Vienna, Austria, April 19-24, 2009.

R. Siegwolf
Isotopes in tree rings as monitors of environmental change
EGU, Vienna, Austria, April 19-24, 2009.

R. Siegwolf
Variability in tree ring stable C and O isotopes as a response to increasing CO_2
Arbeitsgemeinschaft Stabile Isotope, Potsdam, Germany, October 7-9, 2009.

T. Tritscher, M.F. Heringa, R. Chirico, M. Gysel, P.F. DeCarlo, J. Dommen, A.S.H. Prévôt, E. Weingartner, U. Baltensperger
Change of physical aerosol properties during aging of primary emissions in a smog chamber
18. International Conference on Nucleation and Atmospheric Aerosols, Prague, Czech Republic, August 10-14, 2009.

S. Ulli-Beer, M. Bosshardt, P. Dietrich, A. Wokaun
How do country specific boundary conditions affect the diffusion of alternative drive train technologies in the EU?
International advanced mobility forum, PalExpo, Geneva, March 10–12, 2009.

S. Ulli-Beer, M. Bosshardt, P. Dietrich, A. Wokaun
What alternative drive-train technologies and policies are needed to meet a 50% CO_2 reduction target? The case of the EU-fleet
SAE World Congress "Racing to Green Mobility". Sustainable GHG Emission. Detroit, MI, USA, April 2009.

P. Verma
Chemically modified carbons as negative electrodes in Li-ion batteries
PhD Students' Symposium 2009, EMPA Dübendorf, November 19, 2009.

C. Vix-Guterl[1], S.H. Ng, Ph. Bernardo, N. Tran, J. Ufheil, H. Buqa, J. Dentzer[1], R. Gadiou[1], M.E. Spahr[2], J. Saint[2], D. Goers[2], P. Novák
Correlations between surface properties of graphite and the first cycle irreversible capacity in lithium-ion batteries
CARBON 2009, Biarritz, France, June 14-19, 2009.
[1] Institute for Material Science of Mulhouse, France
[2] TIMCAL SA, Bodio

F. Vogel
Katalytische hydrothermale Vergasung nasser Biomasse. Biomasse Co-Verbrennung in der Gasturbine
CCEM Informationsveranstaltung, ETH Zürich, June 16, 2009.

F. Wallasch, G.G. Scherer
Radiation grafted polymer membranes for fuel cell applications
IAEA Workshop, Villigen PSI, June 15-20, 2009.

F. Wallasch, L. Gubler, G.G. Scherer, A. Wokaun
Pre-irradiation grafted films as precursor for fuel cell membranes: Preparation and characterization
238th ACS National Meeting & Exposition, Washington, DC, USA, August 16-18, 2009.

C. Wieckert, N. Piatkowski[1], A. Steinfeld
Experimental investigation of a packed-bed solar reactor for steam-gasification of carbonaceous feedstocks
15th SolarPACES Conference, Berlin, Germany, September 15-18, 2009.
[1] ETH Zürich

A. Wokaun
Energieforum Schweiz
Sessionsveranstaltung, Das IPCC auf dem Prüfstand, Bern, June 11, 2009.

A. Wokaun
Potential und technische Optionen der Sonnenenergienutzung
Seniorenakademie Berlingen, October 7, 2009.

A. Wokaun
Energieperspektiven und Optionen
Lions Club Aarau, November 4, 2009.

M. Zaglio, A. Wokaun, I. Mantzaras, F.N. Büchi
D*evelopment and validation of a dynamic model for PEFCs*
European Fuel Cell Forum 2009, Luzern, June 29 - July 2, 2009.

M. Zaglio, A. Wokaun, I. Mantzaras, F.N Büchi
1-D dynamic model development and validation for PEFCs
6th Symposium on Fuel Cell Modelling and Experimental Validation (MODVAL 6), Bad Herrenalb/Karlsruhe, Germany, March 25-26, 2009.

P. Zieger, R. Schmidhauser, E. Weingartner, J. Strom, U. Baltensperger
Effects of relative humidity on aerosol light scattering
Goldschmidt Conference, Davos, June 21-26, 2009.

P. Zieger, R. Schmidhauser, E. Weingartner, J. Ström, U. Baltensperger
Effects of relative humidity on aerosol light scattering in the Arctic region
EAC, Karlsruhe, Germany, September 6-11, 2009.

POSTERS

E.M.C. Alayon[1], J. Singh[1], M. Nachtegaal, M. Harfouche, J.A. van Bokhoven[1]
Partially oxidized platinum generates high activity for CO oxidation
Swiss Chemical Society Fall Meeting 2009, EPF Lausanne, September 4, 2009.
[1] ETH Zürich

E.M.C. Alayon[1], J. Singh[1], M. Nachtegaal, M. Harfouche, J.A. van Bokhoven[1]
In situ XAS probes catalytic CO oxidation by platinum
First Joint Users' Meeting at PSI (JUM@P '09), Villigen, October 12-13, 2009.
[1] ETH Zürich

M. Arhami, M.C. Minguillón, A. Polidori, R.J. Delfino, J.J. Schauer, C. Sioutas
Organic compound characterization and source apportionment of indoor and outdoor quasi-ultrafine PM in retirement homes of the Los Angeles Basin
- EGU, Vienna, Austria, April 19-24, 2009.
- EAC, Karlsruhe, Germany, September 6-11, 2009.

V. Auzelyte, H. Sigg, B. Schmitt, A. Savouchkina, A. Foelske-Schmitz, H.H. Solak
ZnO films and nanostructures formed from chemical solution by annealing and EUV exposures
Conference, Trends in Nanoscience 2009, Kloster Irsee, Germany, February 28 - March 3, 2009.

S. Balog, U. Gasser, K. Mortensen[1], L. Gubler, H. Ben youcef, G.G. Scherer
Correlation between morphology, water uptake, and proton conductivity in radiation grafted proton exchange membranes
First Joint Users' Meeting @ PSI: JUM@P '09, October 12-13, 2009.
[1] University of Copenhagen, Frederiksberg, Denmark

P.B. Barmet, P.F. DeCarlo, J. Dommen, T. Tritscher, A.P. Praplan, P. Mertes, A.S.H. Prévôt, N.M. Donahue, U. Baltensperger
SOA aging with different OH sources
EAC, Karlsruhe, Germany, September 6-11, 2009.

H. Ben youcef, D. Henkensmeier, L. Gubler, A. Wokaun, G.G. Scherer
Second generation of radiation induced grafted membranes for fuel cells: improved mechanical and oxidative stability
4th International Conference on Polymer Batteries and Fuel Cells (PBFC-2009), Yokohama, Japan, August 2-6, 2009.

A. Bernhard, O. Kröcher, M. Elsener, D. Peitz
Investigation on urea decomposition in the SCR process
EMPA PhD Symposium, Dübendorf, November 19, 2009.

Ph. Bernardo, S.-H. Ng, J. Dentzer[1], R. Gadiou[1], M.E. Spahr[2], D. Goers[2], W. Märkle, P. Novák, C. Vix-Guterl[1]
Influence of graphite surface properties on the first lithium insertion in Li-ion batteries
CARBON 2009, Biarritz, France, June 14-19, 2009.
[1] Institute for Material Science of Mulhouse, France
[2] TIMCAL SA, Bodio

M. Blumthaler, A. Kazantzidis, A. Bais, N. Kouremeti, D. Balis, N. Krotkov, S. Kazadzis, A. Arola, R. Schmidhauser
Aerosol single scattering albedo (SSA) retrieval with various techniques in the UV and visible wavelength range
MOCA-09, Montréal, Canada, July 19-29, 2009.

A. Bodi, N.S. Shuman[1],T. Baer[1], B. Sztaray[2], M. Johnson, T. Gerber
Dissociative photoionization of energy-selected CH_3I^+: iPEPICO at the VUV beamline of the SLS
Gaseous Ions: Structures, Energetics & Reactions Gordon Conference, Galveston TX, USA, March 1–6, 2009.
[1] University of North Carolina, USA
[2] University of the Pacific, Stockton, California, USA

S. Borkar[1], A. Bodi, B. Sztaray[1]
iPEPICO studies on the energetics of atmospherically relevant $S_xO_yCl_z$ ions
Asilomar Conference on Mass Spectrometry, Pacific Grove CA, USA, October 16–20, 2009.
[1] University of the Pacific, Stockton, California, USA

M. Brandenberger, P. Edinger, F. Vogel, Ch. Ludwig
Study on the catalytic heterogeneous direct liquefaction of bovine serum albumin under subcritical water conditions: The case of ammonium
Bio-SNG '09, Int. conference on advanced biomass-to-SNG technologies and their market implementation, Zürich, May 27, 2009.

S. Brandenberger, O. Kröcher, A. Tissler[1], R. Althoff[1]
Assignment of active sites in Fe-ZSM-5 for the selective catalytic reduction of NO_x with ammonia by catalytic tests and statistical considerations
8th International Congress on Catalysis and Automotive Pollution Control, Brussels, Belgium, April 15-17, 2009.
[1] Süd-Chemie AG, Bruckmühl, Germany

M. Casapu, O. Kröcher, M. Elsener, M. Nachtegaal, C. Borca, M. Harfouche, D. Grolimund
Screening of doped MnO_x-CeO_2 catalysts for low-temperature NO-SCR
8th International Congress on Catalysis and Automotive Pollution Control, Brussels, Belgium, April 15-17, 2009.

M. Casapu, O. Kröcher, M. Mehring, M. Nachtegaal, C. Borca, M. Harfouche, D. Grolimund
Characterization of MnO_x-NbO_x-CeO_2 as catalyst for the low-temperature reduction of NO with NH_3
EUROPACAT IX, Salamanca, Spain, August 30 – September 4, 2009.

M. Casapu, O. Kröcher, M. Nachtegaal, C. Borca, M. Harfouche, D. Grolimund
XAS investigations at the Mn and Nb K-edges of the MnO_x-NbO_x-CeO_2 catalyst
Functional Materials Summer School, Zuoz, August 1-7, 2009.

M. Casapu, M. Mehring, S. Brandenberger, O. Kröcher, M. Nachtegaal, C. Borca, M. Harfouche, D. Grolimund
Automotive catalysts studied by XAS
JUMP@P'09, Villigen, October 12-13, 2009.

M. Crippa, C. Mohr, S. Weimer, P.F. DeCarlo, V.A. Lanz, R. Chirico, M.F. Heringa, A.S.H. Prévôt, U. Baltensperger
Mobile measurements of submicron particulate matter including source apportionment
EAC, Karlsruhe, Germany, September 6-11, 2009.

I. Czekaj, F. Loviat, J. Wambach, A. Wokaun
Nickel particles at the γ-Al_2O_3: DFT modelling and XPS studies of model catalyst
25th Annual Meeting SAOG-GSSI "25 Years of Surface Science and SAOG"
Institut de Physique Pérolles, University of Fribourg, January 23, 2009.

I. Czekaj, F. Loviat, J. Wambach, A. Wokaun
DFT modelling and XPS studies of model Ni/Al_2O_3 catalyst: Nickel particles behavior at the support
EUROPACAT IX, Salamanca, Spain, August 29 - September 4, 2009.

I. Czekaj, O. Kröcher
Hydrolysis of isocyanic acid over TiO_2 and γ-Al_2O_3: Unraveling the reaction mechanism by a combination of DFT calculations and DRIFT spectroscopy
25th Annual Meeting SAOG-GSSI "25 Years of Surface Science ans SAOG", Fribourg, January 23, 2009.

I. Czekaj, O. Kröcher
DFT and experimental studies on the hydrolysis of isocyanic acid on the TiO_2-Anatase (101) and γ-Al_2O_3 (100) surfaces
EUROPACAT IX, Salamanca, Spain, August 29 - September 4, 2009.

S. Daniele, P. Jansohn, K. Boulouchos
Experimental investigation of lean premixed syngas combustion at gas turbine relevant conditions: Lean blow out limits, emissions and turbulent flame speed
Proc. Italian Section of the Combustion Institute, Neaples, Italy, 2009.

S.M. Dockheer[1], L. Gubler, W.H. Koppenol[1]
Strategies to improve durability of a solid polymer membrane for fuel cells
Fall Meeting of the Swiss Chemical Society 2009, EPF Lausanne, September 4, 2009.
[1] ETH Zürich

J. Dubrail[1], F. Farges[2], L. Gautron[1], M. Harfouche, C. Borca, D. Grolimund
Pb in naturally irradiated monazites and zircons
XAFS14 Conference, Camerino, Italy, July 26-31, 2009.
[1] Université de Paris-Est Marne la Vallée, France
[2] Muséum National d'Histoire Naturelle de Paris, Paris, France

W. Durisch, J.-C. Mayor, K.-H. Lam[1], S. Dittmann[2], D.Chianese[2]
Climate impacts on the efficiency of a p-Si PV module and annual output under real working conditions
24th European Photovoltaic Solar Energy Conference and Exhibition, Hamburg, Germany, September 21-25, 2009.
[1] University of Hong Kong, Hong Kong, China
[2] SUPSI-ISAAC, Canobbio

J. Eller, F.N. Büchi, R. Flückiger, M. Stampanoni, S. McDonald, F. Marone, D. Tehlar
X-ray tomography study of liquid water in polymer electrolyte fuel cell
Interdisciplinary Symposium on 3D Microscopy, Interlaken, July 12-16, 2009.
Gordon Research Conference on Fuel Cells, Smithfield RI, USA, July 26-31, 2009.

J. Eller, F. N. Büchi, R. Flückiger, M. Stampanoni, S. McDonald , F. Marone , D. Tehlar, A. Wokaun
X-*ray micro tomography study of liquid water in gas diffusion layers of polymer electrolyte fuel cells*
CIMST Interdisciplinary Summer School on Bio-medical Imaging, Zürich, August 24 - September 4, 2009.

J. Eller, F.N. Büchi, S. McDonald , F. Marone , M. Stampanoni , A. Wokaun
Visualization of in-situ liquid water distribution of polymer electrolyte fuel cells using x-ray micro tomography
JUM@P '09: Joint Users' Meeting @ PSI, Villigen, October 12-13, 2009.

M. Esposito, T. Lippert, C.W. Schneider, A. Wokaun, T. Donnelly[1], J.G. Lunney[1], H. Tellez[2], J.M. Vadillo[2], J.J. Laserna[2]
Ion dynamics in pulsed laser ablation of silver
E-MRS Spring Meeting, Strasbourg, France, June 2009.
[1] School of Physics, Trinity College Dublin, Ireland
[2] University of Malaga, Spain

R. Fierz-Schmidhauser, P. Zieger, E. Weingartner, M. Gysel, L. Kammermann, P. DeCarlo, U. Baltensperger
Aerosol light scattering at high relative humnidity at a high alpine site (Jungfraujoch)
EAC, Karlsruhe, Germany, September 6-11, 2009.

M. Frosch, M. Bilde, T. Tritscher, M. Gysel, E. Weingartner, J. Dommen, U. Baltensperger
CCN-activity of chemically aged SOA
EUROCHAMP annual meeting, Binz, Germany, May 14-15, 2009.

M. Geiser, M. Kalberer, A. Gaschen, D. Lang, M. Savi, T. Geiser, A. Gazdhar, C.M. Lehr, M. Bur, J. Dommen, U. Baltensperger
Cellular responses after exposure of lung cell cultures to secondary organic aerosols
EAC, Karlsruhe, Germany, September 6-11, 2009.

Y. Ghermay, I. Mantzaras, R. Bombach
High-pressure high-temperature hydrogen/air hetero/homogeneous combustion
Combustion research in Zürich, October 28, 2009.

L. Gubler, M.M. Menamparambath, A. Wokaun, G.G. Scherer
Rapid aging and locally resolved post test analysis of fuel cell membranes
60th Annual Meeting of the International Society of Electrochemistry, Beijing, China, August 16-21, 2009.

M. Harfouche, F. Farges[1]
XAFS study of the structural behavior of monazite
Goldschmidt Conference, Davos, June 22-26, 2009.
[1] Muséum National d'Histoire Naturelle de Paris, Paris, France

M. Harfouche, J. Labanowski[1], F. Farges[2], E. van Hullebusch[3], C. Borca, D. Grolimund, F. van Oort[4]
Assessment of Zn bioavailability: XAFS study on speciation of zinc-particulate organic matter associations in polluted soils
XAFS14 Conference, Camerino, Italy, July 26-31, 2009.
[1] Université de Poitiers, France
[2] Muséum National d'Histoire Naturelle de Paris, Paris, France
[3] Université Paris-Est Marne la Vallée, France
[4] UR, Physico-chimie et Ecotoxicologie des SolS d Agrosystèmes Contaminés, Versailles, France

S. Heiroth, C.W. Schneider, A. Wokaun, M. Döbeli[1], M.H. Aguirre[2], R. Robert[2], A. Weidenkaff[2], T. Lippert
$LnCo_{1-x}Ni_xO_{3-\delta}$ thin films for thermoelectric applications by pulsed reactive crossed-beam laser ablation
Thermopower Symposium, Dübendorf, July 2009.
[1] PSI / ETH Zurich
[2] EMPA Dübendorf

S. Heiroth, B. Scherrer[1], R. Frison, J.L. M. Rupp[1], T. Lippert, K. Conder, A. Bieberle-Hütter[1], L.J. Gauckler[1]
Microstructure-electrical conduction properties of yttria-stabilized zirconia thin films
CCMX Annual Meeting, Berne, April 2009.
[1] ETH Zürich

M.F. Heringa, P.F. DeCarlo, R. Chirico, A.C.J. Richard, A. Lauber, A. Doberer, J. Good, T. Nussbaumer, A. Keller, N. Meyer, H. Burtscher, B. Miljevic, A.S.H. Prévôt, U. Baltensperger
On-line source measurements of organic aerosols from wood combustion with a high-resolution aerosol mass spectrometer
AAAR 28th Annual Conference, Minneapolis, USA, October 27, 2009.

L. Hildebrandt, B. Lee, G.J. Engelhart, E. Kostenidou, C. Mohr, P.F. DeCarlo, A.S.H. Prévôt, U. Baltensperger, N. Mihalopoulos, N.M. Donahue, S.N. Pandis
Origin, composition and volatility of aged aerosol in the Eastern Mediterranean: The Finokalia Aerosol Measurement Experiments (Spring 2008 and Winter 2009)
AAAR 28th Annual Conference, Minnapolis, Minnesota, USA, Carnegie Mellon University, Pittsburgh, PA, October 28, 2009.

L. Hildebrandt, B. Lee, E. Kostenidou, C. Mohr, G.J. Engelhart, A. Tsimpidi, V. Karydis, P.F. DeCarlo, A.S.H. Prévôt, U. Baltensperger, N.M. Donahue, N. Mihalopoulos, S.N. Pandis
Origin, composition and volatility of aerosol in the Eastern Mediterranean during the EUCAARI Intensive Campaign: The Finokalia Aerosol Measurement Experiment - 2008
EGU, European Geosciences Union General Assembly 2009, Vienna, Austria, Carnegie Mellon University, Pittsburgh, PA, April 19-24, 2009.

L. Hildebrandt, B. Lee, C. Mohr, E. Kostenidou, G.J. Engelhart, P.F. DeCarlo, A.S.H. Prévôt, U. Baltensperger, N.M. Donahue, N. Mihalopoulos, S.N. Pandis
Characterizing composition and volatility of aged organic aerosol: The Finokalia Aerosol Measurement Experiment – 2008
AGU 2009 Fall Meeting, San Francisco, CA, USA, Carnegie Mellon University, Pittsburgh, PA, 21.04.2009, 2009.

W. Hubschmid, R. Bombach
Electrostrictive laser-induced gratings for time-resolved observation of translational-rotational energy transfer in H_2 as source of sound absorption
Gordon Research Conference on Laser Diagnostics in Combustion, Waterville Valley, USA, August 16-21, 2009.

C.M.J.A. Huffman, M.J. Cubison, A.C. Aiken, K.S. Docherty, J.R. Kimmel, I.M. Ulbrich, M. Hannigan, J.L. Jimenez
Characterization of primary organic aerosol emissions from meat cooking, trash burning, and motor vehicles with high-resolution aerosol mass spectrometry
EGU, General Assembly, Vienna, Austria, April 19-24, 2009.

M. Johnson, A. Bodi, T. Gerber
A new VUV beamline at the Swiss Synchrotron Light Source for the study of chemical dynamics
Gordon Conference: Gaseous Ions: Structures, Energetics & Reactions, Galveston, TX, USA, March 1-6, 2009.

Z. Juranyi, M. Gysel, E. Weingartner, P. DeCarlo, U. Baltensperger
Measuring and modeling cloud condensation nuclei concentrations at the Jungfraujoch high alpine site
EAC, Karlsruhe, Germany, September 6-11, 2009.

L. Kammermann, M. Gysel, E. Weingartner, U. Baltensperger
One-year climatology of the aerosol hygroscopicity at the High Alpine Research Station Jungfraujoch (3580 m asl.)
EAC, Karlsruhe, Germany, September 6-11, 2009.

L. Kammermann, M. Gysel, E. Weingartner, U. Baltensperger
A full year of aerosol hygroscopicity measurements at the High Alpine Research Station Jungfraujoch (3580 m asl.)
Fall Meeting of the American Geophysical Union (AGU2009), San Francisco, USA, 2009.

S. Karagiannidis, I. Mantzaras
Numerical investigation of methane-fuelled, catalytic microreactor start-up
4th European Combustion Meeting, Vienna, Austria, April 14-17, 2009.

A. Kazantzidis, N. Krotkov, M. Blumthaler, A. Bais, S. Kazadzis, D. Balis, R. Schmidhauser, N. Kouremeti, E. Giannakaki, A. Arola
Aerosol single scattering albedo retrieval with various techniques in the UV and visible wavelength range
SPIE Ultraviolet and Visible Ground- and Space-based Measurements, Trace Gases, Aerosols and Effects VI, San Diego, CA, USA, August 2-6, 2009.

J. Keller, S. Bojinski, A.S.H. Prévôt
Simultaneous retrieval of aerosol and surface optical properties using Multi-angle Imaging SpectroRadiometer (MISR) data
Wilhelm and Else Heraeus Seminar "Determination of Atmospheric Aerosol Properties Using Satellite Measurements", Bad Honnef, Germany, August 17-19, 2009.

L. Khouchaf[1], A. Hamoudi[1], A.M. Flank[2], M. Harfouche
Study of the reactivity of SiO2 heterophase composit : perspective and role of iron as a trace element
First Joint Users' Meeting (JUM@P '09), ETH Zürich, October 12-13, 2009.
[1] Ecole des Mines de Douai, France
[2] SOLEIL France

E. Kleimenov, A. Bergamaschi, J. van Bokhoven[1], M. Janousch, B. Schmitt, M. Nachtegaal
High-resolution hard-X-ray fluorescence spectrometer
PSI summer school, Zuoz, August 01-07, 2009.
[1] ETH Zürich

E. Kleimenov, A. Bergamaschi, J. van Bokhoven[1], M. Janousch, B. Schmitt, M. Nachtegaal
High-resolution hard-X-ray fluorescence spectrometer
First Joint Users' Meeting (JUM@P '09), ETH Zürich, October 12-13, 2009.
[1] ETH Zürich

G. Knopp, P.P. Radi, M. Johnson, A. Boedi, T. Gerber
Dispersed fs-FWM spectroscopy on 1,5 hexadiyne, di-tert-butyl peroxide and formaldehyde
Femtochemistry, Femtobiology and Femtophysics, Peking, China, August 8-13, 2009.

D.N. Kozlov[1], P.P. Radi, D.A. Sadovskii[2]
energy structure of highly-vibrationally excited overtone-combination states of methane revealed by using laser-induced gratings spectroscopy
European Conference on Nonlinear Optical Spectroscopy (ECONOS), Frascati, Italy, May 25-27, 2009.
[1] Prokhorov General Physics Institute, Moscow, Russia
[2] Université du Littoral, Dunkerque, France

A. Kress, M. Saurer, U. Büntgen, K.S. Treydte, J. Esper, R.T.W. Siegwolf
Temperature, drought and sunshine duration - What do Alpine isotope tree-ring chronologies tell us?
Millennium Milestone Meeting 2009, Mallorca, February 27 - March 6, 2009.

A. Kress, G.H.F. Young, M. Saurer, N.J. Loader, R.T.W. Siegwolf, D. McCarroll
Stable isotope coherence in the earlywood and latewood of tree-line conifers
EGU, Vienna, Austria, April 19-24, 2009.

O. Kröcher, I. Czekaj, D. Nicosia
An explanation for the strong deactivation of vanadia-based SCR catalysts by alkaline and earth alkali elements
8th International Congress on Catalysis and Automotive Pollution Control, Brussels, Belgium, April 15-17, 2009.

O. Kröcher, M. Elsener, E. Jacob[1]
Ammonium formate, methanamide and guanidinium formate as alternative ammonia precursor compounds for the SCR of NO_x in diesel exhaust gas
8th International Congress on Catalysis and Automotive Pollution Control, Brussels, Belgium, April 15-17, 2009.
[1] Emissionskonzepte, Krailling, German

P.G. Loutzenhiser, M.E. Gálvez[1], I. Hischier[2], A. Stamatiou, A. Frei, A. Meier, A. Steinfeld
Kinetic analysis of CO_2 splitting via two-step solar thermochemical cycles with Zn/ZnO and FeO/Fe_3O_4 redox reactions
Proc. 15th SolarPACES Conference, Berlin, Germany, September 15-18, 2009.
[1] Instituto de Carboquímica, Zaragoza, Spain
[2] ETH Zürich

W. Märkle, D. Goers[1], M.E. Spahr[1], P. Novák
Wetting behavior of porous graphite electrodes with carbonate based electrolytes
CARBON 2009, Biarritz, France, June 14-19, 2009.
[1] TIMCAL SA, Bodio

M. Mehring, O. Kröcher, M. Elsener
Investigation of diesel soot reactivity with a new TG-FTIR system for research with condensable and corrosive gases
13th ETH-Conference on Combustion Generated Nanoparticles, Zürich, June 22-24, 2009.

M. Mehring, O. Kröcher, M. Elsener
Development of a TGA-FTIR system for research in the field of exhaust gas aftertreatment
8th International Congress on Catalysis and Automotive Pollution Control, Brussels, Belgium, April 15-18, 2009.

M. Mehring, M. Elsener, O. Kröcher, M. Schubnell[1], J. Jörimann[1], A. Möps[2], D.Hohler[2]
Development of a TGA-FTIR system to be used with condensable and reactive gases
37th Annual Conference of North American Thermal Analysis Society , United States of America, Lubbock, September 20-23, 2009.
[1] Mettler-Toledo
[2] Thermo Scientific, Germany and Switzerland

M.C. Minguillón, X. Querol, E. Monfort, A. Alastuey, A. Escrig, I. Celades, J.V. Miró
Reduction of PM industrial ceramic emissionsreflected on key components concentrations of ambient PM_{10}
EAC, Karlsruhe, Germany, September 6-11, 2009.

C. Mohr, R. Richter, P.F. DeCarlo, R. Chirico, M.F. Heringa, M. Crippa, A.S.H. Prévôt, J.L. Jimenez, X. Querol, U. Baltensperger
Investigation of ambient submicron aerosol in the Barcelona metropolitan area using AMS mobile and stationary data
AAAR 28th Annual Meeting, Minneapolis, Minnesota, USA, October 29, 2009.

K. Mortensen[1], U. Gasser, S. Balog, S. Alkan Gürsel, G.G. Scherer
Structural characterization of radiation-grafted block copolymer films, using SANS technique
JUM@P '09: Joint Users' Meeting @ PSI, Villigen, October 12-13, 2009.
[1] University of Copenhagen, Frederiksberg, Denmark

J. Müller, F. Vogel
Comparative hydrothermal treatment of glycerol and phenol in a batch reactor – investigation of tar and coke formation
Bio-SNG '09, Int. conference on advanced biomass-to-SNG technologies and their market implementation, Zürich, May 27, 2009.

M. Nachtegaal, S. Rabe, T. Ulrich, F. Vogel
Catalytic supercritical gasification of wet biomass: Identifying the catalytically active sites using in situ XAS
EuropaCat IX, Salamanca, Spain, August 30 - September 4, 2009.

D. Peitz, O. Kröcher, M. Elsener
NO_x reduction in Diesel exhaust gas by Guanidinium salts
EMPA PhD Symposium, Dübendorf, November 19, 2009.

N. Perron, S. Szidat, S. Fahrni, L. Wacker, A.H.S. Prévôt, U. Baltensperger, H. Gäggeler
Radiocarbon online analysis of atmospheric samples
20th International Radiocarbon Conference, Big Island, Hawaii, USA, May 31 - June 5, 2009.

A.P. Praplan, T. Tritscher, P. Barmet, P. Mertes, P.F. DeCarlo, J. Dommen, A.S.H. Prévôt, N.M. Donahue, U. Baltensperger
Aerosol and gas phase organic acids in smog chamber aging experiments of secondary organic aerosol from α-pinene
EAC, Karlsruhe, Germany, September 6-11, 2009.

N.I. Prasianakis, I. Mantzaras
Lattice Boltzmann simulation of transport phenomena in fuel cell systems and catalytic microreactors
Combustion research in Switzerland, Zürich, October 28, 2009.

A.S.H. Prévôt, S. Szidat, N. Perron, V.A. Lanz, M.R. Alfarra, P.F. DeCarlo, C. Mohr, U. Baltensperger
Fossil and non-fossil primary and secondary organic aerosol
Gordon Conference on Atmospheric Chemistry, Waterville Valley, USA, August 23-28, 2009.

S. Regenspurg[1,2], C. Roquier[1], M.Harfouche, P. Froidevaux[3], P. Steinmann[4], P. Junier[1], R. Bernier-Latmai[1]
Accumulation of uranium in alpine soil
First Joint Users' Meeting (JUM@P '09), ETH Zürich, October 12-13, 2009.
[1] EPF Lausanne
[2] Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Germany
[3] University of Lausanne, IURA Lausanne
[4] BAG Bern

A. Richard, M. Furger, N. Bukowiecki, P. Lienemann, M. Nachtegaal, A.S.H. Prévôt and U. Baltensperger
Hourly-size segregated sampling of trace elements and subsequent source apportionment
JUMP09 Users Workshop @ SLS, Villigen, October 12-13, 2009.

S. Rossano[1,2], L. Jean-Soro[2], B. Boizot[1], F. Farges[3], E. van Hullebusch[2], J. Labanowski[2], L. Gouzin[4], R. Combes[2], J. Linares[2], J. C. Swarbrick[5], M. Harfouche
Oxidation state variation under β-irradiation in an iron-bearing soda lime glass system
XAFS14 Conference, Camerino, Italy, July 26-31, 2009.
[1] Ecole Polytechnique, Palaiseau, France
[2] Université Paris-Est Marne la Vallée, France
[3] Muséum National d'Histoire Naturelle de Paris, Paris, France
[4] Université de Poitiers, France
[5] ESRF Grenoble, France

A.A. Rouff, S. Rabe, M. Nachtegaal, F. Vogel
Investigating the effect of protonation on disorder and multiple scattering in phosphate solutions and solids using XAFS
238th American Chemical Society National Meeting, poster session, Washington DC, USA, August 16-20, 2009.

M. Schubert, J. Müller, F. Vogel
Kontinuierliche, heterogen katalysierte, hydrothermale Vergasung salzhaltiger Glycerollösungen zu synthetischem Erdgas
42. Jahrestreffen Deutscher Katalytiker, Weimar, Germany, March 11-13, 2009.

M. Schubert, J. Müller, F. Vogel
Salt separation and recovery from supercritical water
Bio-SNG '09, Int. conference on advanced biomass-to-SNG technologies and their market implementation, Zürich, May 27, 2009.

M. Schubert, J. Müller, F. Vogel
Influence of K_3PO_4 on the catalytic hydrothermal gasification of glycerol
17th European Biomass conference and Exhibition, Hamburg, Germany, June 29 - July 3, 2009.

H. Schulenburg, B. Schwanitz, J. Krbanjevic, M. Stampanoni, A. Wokaun, G.G. Scherer
3D imaging of polymer electrolyte fuel cell electrodes by high-resolution X-ray tomography and FIB/SEM serial sectioning
Interdisciplinary Symposium on 3D Microscopy, Interlaken, Juli 12-16, 2009.
2009 CIMST Summer School, Zürich, August 24 – September 4, 2009.
8th PSI Summer School on Condensed Matter Research, Zuoz, August 1-7, 2009.

J. Shaw-Stewart[1], M. Nagel[2], F. Nüesch[2], T. Lippert, A. Wokaun
Developing multi-layer OLEDs for transfer using laser-induced forward transfer
EMPA PhD Symposium, Dübendorf, November 2009.
[1] EMPA Dübendorf/PSI
[2] EMPA Dübendorf

J. Shaw-Stewart[1], M. Nagel[2], F. Nüesch[2], T. Lippert, A. Wokaun
Developing multi-layer OLEDs for transfer using laser-induced forward transfer
EMPA Departments' day, Dübendorf, November 2009.
[1] EMPA Dübendorf/PSI
[2] EMPA Dübendorf

J. Shaw-Stewart[1], R. Fardel[1], M. Nagel[2], F. Nüesch[2], T. Lippert, A. Wokaun
The effect of laser pulse lengths upon laser-induced forward transfer using triazene polymer as a sacrificial layer
E-MRS Spring Meeting, Strasbourg, France, June 2009.
[1] EMPA Dübendorf/PSI
[2] EMPA Dübendorf

O.V. Sidorova, M. Saurer, R.T.W. Siegwof
A spatial description of climatic changes along circumpolar regions inferred from tree ring parameters and stable isotopes
MILLENIUM Milestone Meeting, Mallorca, Spain, March 3-5, 2009.

O.V. Sidorova, R.T.W. Siegwolf, M. Saurer
The need for dendroecological and stable isotope investigations for revealing climatic and environmental changes in the Eurasian northern transect
International conference of Long-term ecosystem research:understanding the present to shape the future, ETH Zürich, September 7-10, 2009.

F. Simmen, T. Lippert, P. Novák, M. Horisberger, M. Döbeli, M. Mallepell, A. Wokaun
Influence of metal layer coated glassy carbon substrates on the properties of PLD deposited $Li_{1+x}Mn_2O_{4-\delta}$ films
E-MRS Spring Meeting, Strasbourg, France, June, 2009.

W.R. Stevens[1], A. Bodi, N.S. Shuman[1], C. Pongor[2], T. Baer[1]
iPEPICO analysis of group IVB tetrachlorides
Gaseous Ions: Structures, Energetics & Reactions Gordon Conference, Galveston TX, USA, March 1–6, 2009.
[1] University of North Carolina, Chapel Hill, North Carolina, USA
[2] Eötvös Loránd University, Budapest, Hungary

T. Todorova, B. Delley, I. Czekaj, D. Peitz, O. Kröcher
Guanidinium formate decomposition on the TiO_2-Anatase (101) surface by means of DFT calculations
EUROPACAT IX, Salamanca, Spain, August 29 - September 4, 2009.

T. Tritscher, M.F. Heringa, R. Chirico, R. Schmidhauser, M. Gysel, P.F. DeCarlo, J. Dommen, A.S.H. Prévôt, E. Weingartner, U. Baltensperger
Change of physical aerosol properties during aging of combustion emissions in a smog chamber
13. ETH Nanoparticle Conference, Zürich, June 22, 2009.

M. Tulei[1], P.P. Radi, G. Knopp, T. Gerber
Degenerate and two-color resonant four-wave mixing of C_2- in a molecular beam environment
7th International Symposium Towards Clean Diesel Engines, Aachen, Germany, June 4-5, 2009.
[1] University of Bern

M. Tulei[1], G. Knopp, P. Bornhauser, T. Gerber, P.P. Radi
Highly sensitive double-resonance spectroscopy of transient molecules in a free-jet by four-wave mixing spectroscopy
- 30th International Conference of Free Radicals, Savonlinna, Finland, July 25-30, 2009.
- European Conference on Nonlinear Optical Spectroscopy (ECONOS), Frascati, Italy, May 25-27, 2009.

[1] University of Bern

F. Vogel
Hydrothermale Vergasung – der SunCHem-Prozess
3. Bundes-Algen-Stammtisch, Köln, Germany, June 22, 2009.

M. Wälle[1], J. Koch[1], S. Heiroth, T. Lippert, D. Günther[1]
Bestimmung der Schichtzusammensetzung von GMR-Materialien mittels Femtosekunden Laserablation induktiv-gekoppelter Massenspektrometrie
ANAKON 2009, Berlin, Germany, March 2009.
[1] ETH Zürich

F. Wallasch, L. Gubler, G.G. Scherer, A. Wokaun
Advanced fuel cell membranes using graft copolymerization
Asian Polymer Association (APA) 2009, New Delhi, India, December 17-20, 2009.

A.M. Walser, M. Meisinger, P.P. Radi, T. Gerber, G. Knopp
Monitoring the molecular dynamics of ro-vibrational manifolds in the A^1A_2 sate of H2CO by fs- TCFWM
European Conference on Nonlinear Optics and Spectroscopy (ECONOS), Frascati, Italy, Mai 24-27, 2009.

M. Widmer, M. Elsener, O. Kröcher, D. Rothe[1]
Storage and release phenomena of SO_x on platinum-based diesel oxidation catalysts
8th International Congress on Catalysis and Automotive Pollution Control, Brussels, Belgium, April 15-17, 2009.
[1] MAN Nutzfahrzeuge AG, Nürnberg, Germany

P. Zieger, R. Schmidhauser, E. Weingartner, J. Strom, U. Baltensperger
Effects of relative humidity on aerosol light scattering
Goldschmidt Conference, Davos, June 21-26, 2009.

P. Zieger, E. Weingartner, R. Schmidhauser, U. Baltensperger, J. Ström
Effects of relative humidity on aerosol light scattering, Part II: - Measurements in Ny-Alesund, Spitzbergen
GEOmon Annual Meeting, Geneva, January 26-28, 2009.

P. Zieger, E. Weingartner, R. Schmidhauser, M. Gysel, L. Kammermann, U. Baltensperger, G. Jennings
Effects of relative humidity on aerosol light scattering, Part I: - WP 3.1 Ground based monitoring of aerosols
GEOmon Annual Meeting, Geneva, January 26-28, 2009.

PATENT APPLICATIONS

O. Kröcher, M. Elsener
Hydrolysis and oxidation of gaseous HCN over catalysts
Patent Application No. EP 09161936, 2009.

CONFERENCES, WORKSHOPS & EXHIBITIONS

F.N. Büchi
Gordon Research Conference on Fuel Cells
Smithfield, RI, USA, July 26-31, 2009.
Chair

S. Hermle, St. Renz, K. Boulouchos, P. Jansohn
Verbrennungsforschung in der Schweiz
Semper Sternwarte, Zürich, October 28, 2009.
Organizer

P. Jansohn
Forschungsprogramm “Kraftwerk 2020” (Jahrestagung)
Bundesamt für Energie (BFE), Bern, June 22, 2009.
Organizer/Program head

R. Kötz
1st International Symposium on Enhanced Electrochemical Capacitors, ISEECap’09
Nantes France, June 29 -July 2, 2009.
International Scientific Committee

R. Kötz
5th IUPAC International Symposium on Novel Materials and their Synthesis
Shanghai, China, October 18-22. 2009.
Session Chair

T. Lippert
10th International Conference on Laser Ablation (COLA’09), Singapore, November 2009.
Member of steering committee.

T. Lippert
International conference on *Advanced Laser Technologies (ALT’ 09)*, Antalya, Turkey, September 2009.
Member of the international program committee.

T. Lippert
International Conference on Perovskites: Properties and Potential Applications, jointly with the IUMRS, Cancun, Mexico, August 2009.
Member of the international advisory committee

T. Lippert
International Symposium on Laser Precision Microfabrication (LPM 2009), Kobe, Japan, July 2009.
Member of the program committee.

T. Lippert
Symposium on Laser and Plasma Processing for Advanced Materials, of the E-MRS 2009 conference, Strasbourg, France, June 2009.
Member of the international advisory committee

T. Lippert
Laser Processing of Materials: Fundamentals and Applications, Baltimore, USA, May 2009.
Sub-committee member of CLEO/IQEC’09.

A. Meier
15th SolarPACES Conference Berlin, Germany, September 15-18, 2009
Member Scientific Committee

A. Meier
1st EERA Workshop on CSP
PSI / ETH Zürich, December 4, 2009.
Organizer

M. Nachtegaal
JUM@P
SLS, SINQ user meeting, PSI Villigen, October 12-13, 2009.
Co-organizer

P. Novák
60th Annual Meeting of the International Society of Electrochemistry
Beijing, China, August 16-21, 2009.
Organizing Committee

R. Philipona[1], M. Furger
Jahrestagung der Schweizerischen Gesellschaft für Meteorologie
7th Swiss Geoscience Meeting 2009, Session 05 'Meteorology and Climatology', Neuchâtel, scnat, 2009.
Session Convener
[1] MeteoSchweiz, Payerne

G.G. Scherer, R. Kötz, P. Novák
Electrochemistry: Learning from the past to master the future
25th One-Day-Symposium, PSI Villigen, May 06, 2009.
Organizers

G.G. Scherer
Development of novel absorbents and membranes by radiation-induced grafting for selective purposes
IAEA 2nd Research Coordination Meeting, PSI Villigen, June 15-19, 2009.
Organizer

G.G. Scherer
Polymer Science and Technology: Vision & Scenario
APA 2009, New Dehli, India, December 16-20, 2009.
International Advisory Committee

G. Siddiqi, M. Wolf, P. Jansohn
IEA GHG R&D Programme (36th Executive Committee Meeting)
SwissRe Centre for Global Dialogue, Rüschlikon, October 7-9, 2009.
Organizer/Host

A. Steinfeld
3rd World Congress of Young Scientists on Hydrogen Energy Systems, *Italy*
Scientific Committee

S. Stucki
Bio-SNG'09, Int. Conference on advanced biomass-to-SNG technologies and their market implementation,
Zürich, May 26-27, 2009.
Organizer

Ulli-Beer, S.S. Groesser, S. Bruppacher, R. Kaufmann-Hayoz
Abschlussworkshop Diffusionsdynamik energieeffizienter Bauten
Ergebnisse des NFP 54Projekts, Alte Mühle, Langenthal, Januar 14, 2009.
Organizing Committee

S. Ulli-Beer, E. Moxnes
Thread Chair Energy and Resources & Member of the Organising Committee
27th International Conference of the System Dynamics Society, Albuquerque, New Mexico, USA,
July 26-30, 2009.
Organizing Committee

Ch. Wieckert
15th SolarPACES Conference, Berlin, Germany, September 15-18, 2009
Member Scientific Committee

A. Wokaun
2nd International Advanced Mobility Forum, IAMF, Geneva PALEXPO, March 10-12, 2009
Member of the Scientific Committee

MEMBERSHIPS IN EXTERNAL COMMITTEES

S. Andreani-Aksoyoglu
International Symposium on Air Quality Management at Urban, Regional and Global Scales
Scientific Advisor

Urs Baltensperger
Umweltforschung der Forschungszentrum Jülich GmbH
Wissenschaftlicher Beirat, Vorsitzender
Wissenschaftlich-Technisches Ausschuss Mitglied

U. Baltensperger
sc nat Commission, Atmospheric Chemistry and Physics
President

U. Baltensperger
Scientific Advisory Group for Aerosol within Global Atmosphere Watch
Member

U. Baltensperger
ESF Programme, Interdisciplinary Tropospheric Research: from the Laboratory to Global Change (INTROP)
Scientific Steering Committee

U. Baltensperger
Atmospheric Chemistry and Physics
Editorial Board

U. Baltensperger
Canadian Network for the Detection of Atmospheric Change (CANDAC)
Board of Directors

U. Baltensperger
Atmospheric Measurement Techniques
Editorial Board

U. Baltensperger
Programme Advisory Board of APPRAISE (Aerosol Properties, Processes And InfluenceS on the Earth's climate)
Chairman

I. Barmpadimos
COST 728-European Cooperation in the field of Scientific and Technical Research
Delegate of Switzerland

W. Durisch
Prüfungskommission für die Lehrlinge des Laborantenberufes des Kantons Zürich
Prüfungsexperte

W. Durisch
International Energy Foundation, IEF
Advisory Committee Member and Under Secretary Science and Technology

W. Durisch
World Renewable Energy Congress
Steering Committee Member

W. Durisch
International Journal RENEWABLE ENERGY, Elsevier Ltd, Oxford, UK
Reviewer

M. Furger
Schweizerische Gesellschaft für Meteorologie
President

M. Furger
SNC-IUGG - Swiss National Committee of the International Union of Geodesy and Geophysics
National Correspondent of the International Association of Meteorology and Atmospheric Sciences (IAMAS)
Member

T. Gerber
Towards Clean Diesel Engines
Steering Committee

M. Hänchen
Solar Facilities for the European Research Area (SFERA)
Access Committee Member

P. Jansohn
International Energy Agency (IEA),
Implementing Agreement on Energy Conservation and Emission Reduction in Combustion
Collaborative Task Leader "Gas Turbine Combustion"

P. Jansohn
International Energy Agency (IEA), GHG R&D Programme
Representative (Alternate) for Switzerland

P. Jansohn
ProcessNet Fachgemeinschaft „Sustainable Production, Energy and Resources",
Fachausschuss „Hochtemperaturtechnik"
Member

P. Jansohn
European Turbine Network (ETN),
Member

P. Jansohn
European Technology Platform – Zero Emission Fossil Fuel Power Plants (ETP-ZEP),
Taskforce Technology and Government Group
Member/ Representative (Alternate) for Switzerland

R. Kötz
Publication Committee of the International Society of Electrochemistry
Chair

R. Kötz
Advisory Board Electrochimica Acta
Member

T. Lippert
Board of Delegates E-MRS
Board

T. Lippert
Executive Committee of the E-MRS
Member

T. Lippert
Journal of Laser Micro/Nanoengineering (JLMN)
Co-Editor

T. Lippert
Laser Chemistry
Associate Editor

T. Lippert
Materials
Member of the Editorial Board

P.G. Loutzenhiser
ASME Solar Energy Division
Technical Committee Chair for Solar Chemistry & Bio Conversion

Ch. Ludwig
R'09 Twin World Congress on Resource Management and Technology for Material and Energy Efficiency Davos, Switzerland
Member

Ch. Ludwig
World Resources Forum 2009
Member

A. Meier
International Energy Agency SolarPACES
Operating Agent

A. Meier
SOLLAB – Alliance of European Laboratories on Solar Thermal Concentrating Systems
Steering Committee

M. Nachtegaal
Rossendorf beamline ESRF upgrade workhop
Member

M. Nachtegaal
SNX EXAFS commission
Member

P. Novák
International Society of Electrochemistry
Vice-President

P. Novák
Materials
Member of the Editorial Board

A.S.H. Prévôt
sc nat Commission, Atmospheric Chemistry and Physics
Member

A.S.H. Prévôt
Atmospheric Chemistry and Physics
Editorial Board

A.S.H. Prévôt
Atmospheric Measurement Techniques
Editorial Board

P.P. Radi
European Conference on Nonlinear Optical Spectroscopy
Steering Committee

P.P. Radi
Journal of Raman Spectroscopy
Member of the editorial board

M. Saurer
Association for Tree-Ring Research
Advisory Council

M. Saurer
Dendrochronologia
Associate Editor

G.G. Scherer
Asian Polymer Association, New Delhi, India
Honorary Member

G.G. Scherer
Advisory Board Electrocatalysis
Member

G.G. Scherer
Advisory Board European Fuel Cell Forum
Member

G.G. Scherer
Kantonsschule Wohlen
Maturitätsprüfungsexperte Biologie/Chemie

R.T.W. Siegwolf
Tree Physiology
Editorial Review Board

R.T.W. Siegwolf
German Association for Stable Isotope Research (GASIR)
Stellvertretender Vorsitzender der Arbeitsgemeinschaft

A. Steinfeld
Director of Research and PhD Studies
Department of Mechanical and Process Engineering, ETH Zurich

A. Steinfeld
SOLLAB – Alliance of European Laboratories on Solar Thermal Concentrating Systems
Steering Committee

A. Steinfeld
IMDEA-Energía, *Spain*
Scientific Council

A. Steinfeld
TMS (Minerals, Metals & Materials Society)
Member – Energy Committee

A. Steinfeld
SANDIA Laboratories' "Sunshine to Petrol" program
Member Advisory Board

A. Steinfeld
European Federation of Chemical Engineering
Member - Process Engineering for Alternative Energy Resources Committee

A. Steinfeld
ASME Kreith Energy Award
Member Selection Committee

S. Stucki
Review of the Helmholtz Programme “Renewable Energies”
Member of the Review Panel

S. Stucki
TA Swiss Assessment Treibstoffe aus Biomasse
Mitglied der Begleitgruppe

E. Weingartner
Fachgruppe zum Thema: Partikelzählung/ Partikelgrössenanalyse
Ziel: Erarbeiten von Empfehlung zum Einsatz von Partikelzählern und Partikelgrössenanalysatoren bei Aerosolen
Member

E. Weingartner
Atmospheric Chemistry and Physics
Editorial Board

S. Ulli-Beer
Journal of Environmental Management
Invited Reviewer

S. Ulli-Beer
Journal of Ecological Economics
Invited Reviewer

S. Ulli-Beer
System Dynamics Review
Associated editors

S. Ulli-Beer
Proceedings of the International System Dynamics Conference
Reviewer

Ch. Wieckert
Hydropole-Swiss Hydrogen Association
Board Member

A. Wokaun
Schweizerische Akademie der Technischen Wissenschaften (SATW)
Einzelmitglied

A. Wokaun
Helmholtz-Gemeinschaft deutscher Forschungszentren
Mitglied der Senatskommission

A. Wokaun
European Climate Forum
Member of Council

A. Wokaun
novatlantis – Nachhaltigkeit im ETH-Bereich
Mitglied des Leitungsausschusses

A. Wokaun
Studiengruppe Energieperspektiven
Präsident

A. Wokaun
CORE
Mitglied

A. Wokaun
Advisory Group on Energy (AGE), European Union
Mitglied

A. Wokaun
Competence Center Energy and Mobility (CCEM)
Chairman of Steering Committee

AWARDS

Projektteam Methan aus Holz[1]
Watt d'Or 2009
BFE, Bern, January 8, 2009.
[1] PSI, CTU Winterthur, TU Wien, Repotec Wien, Austria, Biomassekraftwerk Güssing, Germany

Projektteam Methan aus Holz[1]
Schweighofer Prize 2009
European Innovation Award for Forestry, Wood Technology and Timber Products
Wien, Austria, June 18, 2009.
[1] PSI, CTU Winterthur, TU Wien, Repotec Wien, Austria, Biomassekraftwerk Güssing, Germany

H. Hagendorfer[1,4], C. Lorenz[2], R. Kaegi[3], B. Sinnet[3], R. Gehrig[1], Ch. Ludwig, A. Ulrich[1]
Coupling of asymmetric flow field flow fractionation (A4F) to ICPMS for nanoparticle (NP) analysis in consumer products
Poster Prize 2nd place at European Winter Conference on Plasma Spectrochemistry, Graz, Austria, February 15-20, 2009.
[1] EMPA Dübendorf
[2] ETH Zürich
[3] EAWAG Dübendorf,
[4] EPF Lausanne

P. Kesselring
IEA-SolarPACES Lifetime Achievement Award
15th SolarPACES Symposium, Berlin, Germany, September 17, 2009.

C. Mohr
The American Association for Aerosol Research - Student Poster Competition Winner
AAAR 28th Annual Meeting, Minneapolis, MA, October 30, 2009.

G.G. Scherer
Christian Friedrich Schönbein Medal of Honour
Scientific Advisory Committee of the European Fuel Cell Forum 2009, Luzern, July 2, 2009.

M. Schubert, J. Müller, F. Vogel
Influence of K_3PO_4 on the catalytic hydrothermal gasification of glycerol
Best Poster Award in the topic "solid/gaseous biofuels", 17th European Biomass Conference and Exhibition, Hamburg, Germany, June 29 - July 03, 2009.

A. Steinfeld
Treibstoff aus Sonnenenergie
ASME Yellott Award
San Francisco, USA, July 22, 2009.

A. Ulrich[1], H. Hagendorfer[1,4], C. Lorenz[2], R. Gehrig[1], R. Kaegi[3], B. Sinnet[3], J. Traber[3], N. v.Goetz[2], M. Scheringer[2], Ch. Ludwig
Size fractionated analysis of engineered nanaoparticles from materials using FFF-ICPMS
Poster Prize 1st place at CANAS 09, Freiberg, Germany, (as second author), March 22-25, 2009.
[1] EMPA Dübendorf
[2] ETH Zürich
[3] EAWAG Dübendorf
[4] EPF Lausanne

LIST OF PUBLICATIONS 2009

Large Research Facilities and SwissFEL Project

UNIVERSITY LEVEL AND OTHER TEACHING

A. Adelmann
Educational Session: Advanced Beam Dynamics
XXXVII European Cyclotron Progress Meeting, Groningen, the Netherlands
28-31 October 2009

A. Adelmann
Statistics and Probability theory
University of Technology Economics and Business Administration Zurich, Switzerland
Spring Semester 2009

A. Adelmann, P. Arbenz
Parallel Numerical Methods
ETH- Zurich, Switzerland
Spring Semester 2009

M. Boege
Orbit Control & Feed-back Systems
Cockcroft Institute Lecture Courses, Daresbury, UK
2 March 2009 and 30 March 2009

M. Boege
Orbit Feedback & Stability
CERN Accelerator School Intermediate Level, TU Darmstadt, Germany
3 October 2009

M. Dittmar, U. Langenegger, K. Müller, O. Steinkamp, U.D. Straumann, A. Streun
Experimental Methods of Particle Physics
Zurich University (UZH) and Zürich Technical University (ETHZ)
Autumn Semester 2009

R. Doelling
Educational Session: Beam Diagnostics for Cyclotrons
XXXVII European Cyclotron Progress Meeting, Groningen, the Nederlands
28-31 October 2009

D. Kiselev
Aktuelle Experimente am Beschleuniger zur Kern- und Nukleonenstruktur
University of Basel, Switzerland
Spring Semester 2009

J.A. Patorski
Thermographische Temperaturmessung
Paul Scherrer Institut, Villigen, Switzerland, Lehrkurs (3 x 3 Tage)
November 2009

B.D. Patterson, H.J. Weyer, H. Sigg
Synchrotron Radiation Praktikum at the SLS
University of Zurich, Switzerland
Spring Semester 2009

B.D. Patterson, Th. Greber
Electron Correlations
University of Zurich, Switzerland
Autumn Semester 2009

B.D. Patterson
Using the proposed SwissFEL XFEL to study biomolecular structure and function
2 lectures in the course „Molecular Biophysics“ (D. Klostermeier)
University of Basel, Switzerland
6 October 2009

B.D. Patterson
The SwissFEL X-ray Laser Project at PSI
Lecture in the course „ Medical Imaging and Therapeutic Applications of Particle Physics “
(B. Müller and T. Lomax)
ETH Zurich, Switzerland
11 November 2009

B.D. Patterson
Condensed Matter Science with the SwissFEL X-ray Laser
Lecture at the 8th PSI Summer School on Condensed Matter Research: Functional Materials
Zuoz, Switzerland
7 August 2009

L. Rivkin
Introduction to Particle Accelerator Physics
EPFL, Lausanne, Switzerland
Autumn Semester 2009

S. Sanfilippo
Course on “Hall Probes: Physics, Measurements & Applications”
CERN Accelerator School (CAS) “Magnets”, Bruges, Belgium
16 - 25 June 2009

T. Schietinger
The PSI Low-Emittance-Gun Test Stand
Joint University Accelerator School (JUAS), PSI, Villigen, Switzerland
27 February, 2009

J.M. Schippers
Accelerators for proton therapy
PSI Winterschool, Bad Zurzach, Switzerland
25 January 2009

J.M. Schippers
Protontherapy: scanning and advanced technologies
Lecture Hadron Therapy, Technical University Delft, Delft, the Netherlands
19 February 2009

J.M. Schippers
The SC-cyclotron at PSI and other accelerators for proton therapy
Joint University Accelerator School (JUAS), PSI, Villigen, Switzerland
26 February 2009

J.M. Schippers
Particle Generation, Accelerator Technology and New technologies for hospital based particle therapy centers
ESTRO Teaching Course on Radiotherapy with Protons and Ions, Pfäffikon, Switzerland
10-14 May 2009

J.M. Schippers
Cyclotrons for Particle Therapy
Teaching course at PTCOG 48, Heidelberg, Germany
28-30 September 2009

J.M. Schippers
Radiobiology in Radiotherapy
Medical Physics Course, ETH Zurich, Switzerland
13 November 2009

M. Schneider
Grundlagen der Elektronik
Technikerschule HF, Zürich, Switzerland
Spring Semester 2009, Autumn Semester 2009

A. Streun
The source of "it all" – Particle Accelerators
8th PSI Summer School on Condensed Matter Research, Zuoz, Switzerland
1-7 August, 2009

A. Streun
Introduction to Synchrotron Radiation Facilities
AIC Information Day on "Large Facilities for Crystallography Studies: Synchrotron and Neutron sources
Paul Scherrer Institut, Villigen, Switzerland
19 October 2009

PEER REVIEWED PAPERS

P. Bosted, J. Dunne, C. A. Lee, P. Junnarkar, J. Arrington, R. Asaturyan, F. Benmokhtar, M.E. Christy, E. Chudakov, B. Clasie, S. H. Connell, M. M. Dalton, A. Daniel, D. Day, D. Dutta, R. Ent, N. Fomin, D. Gaskell, T. Horn, N. Kalantarians, C.E. Keppel, D.G. Meekins, H. Mkrtchyan, T. Navasardyan, J. Roche, V. M. Rodriguez, D. Kiselev, J. Seely, K. Slifer, M. Strikman, S. Tajima, G. Testa, R. Trojer, F.R. Wesselmann, S.A. Wood, X.C. Zheng}
Search for Sub-threshold Photoproduction of J/Psi Mesons
Phys. Rev. C**79**, 015209 (2009)

M. Dehler, J.-Y. Raguin, A. Citterio, A. Falone, W. Wuensch, G. Riddone, A. Grudiev, R. Zennaro
X-band rf structure with integrated alignment monitors
PRST - AB **12**, 062001 (2009)

F.X. Gallmeier, M. Wohlmuther, U. Filges, D. Kiselev, G. Muhrer
Implementation of Neutron Mirror Modeling Capability into MCNPX and its Demonstration in First Applications
Nucl. Technology **168**, 768 (2009)

E. Kirk, S. Tsujino, T. Vogel, K. Jefimovs, J. Gobrecht, A. Wrulich
Fabrication of all-metal field emitter arrays with controlled apex sizes by molding
J. Vac. Sci. Technol. B **27**, 1813 (2009)

J. Krimmer, M. Distler, W. Heil, S. Karpuk, D. Kiselev, Z. Salhir, E.W. Otten
A Highly Polarized ^{3}He Target for the Electron Beam at MAMI
Nucl. Instr. Meth., A **611**, 18 (2009)

G. Lambert, J. Gautier, C.P. Hauri, Ph.Zeitoun, C. Valentin, T. Marchenko, JP Goddet,
M. Ribiere, G. Rey, M. Fajardo, S. Sebban
An optimized kHz two-colour high harmonic source for seeding free-electron lasers and plasma-baed soft x-ray lasers
New J. Phys., **11**, 8, 083033 (2009)

E. Le Bigot, S. Boucard, D. Covita, D. Gotta, A. Gruber, A. Hirtl, H. Fuhrmann, P. Indelicator,
J. dos Santos, S Schlesser, L. Simons, L. Stingelin, M. Trassinelli, J. Veloso, A. Wasser,
J. Zmeskal
High-precision x-ray spectroscopy in few-electron ions
Phys. Scr., **T134**, 014015 (2009)

S.C. Leemann, Å. Andersson, M. Eriksson, L.-J. Lindgren, E. Wallén, J. Bengtsson, A. Streun
Beam dynamics and expected performance of Sweden's new storage-ring light source MAX IV
Phys. Rev. ST Accel. Beams, **12**, 120701 (2009)

A. Lüdeke
Operation event logging system of the Swiss Light Source
Phys. Rev. ST Accel. Beams, **12**, 024701 (2009)

R. Milenkovic, S. Dementjevs, K. Samec, E. Platacis, A. Zik, A. Flerov, K. Thomsen
Structural-hydraulic liquid metal test of the EURISOL target mock-up
Nucl. Instr. and Meth., A **607**, Issue 2, 279 (2009)

R. Milenkovic, S. Dementjevs, K. Samec, A. Flerov, K. Thomsen
Wavelet analysis of experimental results for coupled structural-hydraulic behavior of the EURISOL target mock-up
Nucl. Instr. and Meth., A, **608**, 175 2009

R. Milenković, K. Samec, S. Dementjevs, A. Flerov, W. Wagner
Detection of a structural impact in liquid metal flow during test runs of the EURISOL target mock-up
Nucl. Instr. and Meth., A **609**, 1 (2009)

A. Mozzanica, A. Bergamaschi, R. Dinapoli, G. Gozzo, B. Henrich, P. Kraft, B. Patterson and
B. Schmitt
MythenII: A 128 channel single photon counting readout chip
Nucl. Inst. Meth. Phys. Res. A **607**, 250 (2009).

B. Oswald, P. Leidenberger
Electromagnetic Fields Scattered by Sub-wavelength Sized Object of Drude Type Material in the Optical Region, Using a Finite Element Time Domain Method
Journal of Computational and Theoretical Nanoscience, {6}(3), 784, doi 10.1166/jctn. 1109 (2009)

S. Panebianco, K. Berg, J.-C. David, M. Eid, U. Filges, F. Gröschel, A. Guertin, A. Yu. Konobeyev, C. Latgé, S. Lemaire, S. Leray, A. Letourneau, M. Lüthy, F. Michel-Sendis, S. Scazzi, G. Stankunas, N. Thiollière, L. Tobler, L. Zanini
Neutronic Characterization of the MEGAPIE target
Annals of Nuclear Energy **36**, 350 (2009)

J.A. Patorski, M. Gindrat
High heat flux sensor for infrared thermography determination of heat transfer coefficient of liquid metal cooled target's wall" in Thermosense XXXI
edited by Douglas D. Burleigh, Ralph B. Dinwiddiem, Proc. SPIE, **7299**, 729904 (SPIE, Bellingham, WA 2009)

J.A. Patorski
Thermo-Hydraulics, Colour and Art
Int. J. of Design & Nature and Ecodynamics, **4**, No.3 (2009)
WIT Press www.witpress.com, ISSN: 1755-7437 (paper format), ISSN: 1755-7445 (online)

G. Rugel, T. Faestermann, K. Knie, G. Korschinek, M. Poutivtsev, D. Schumann, N. Kivel, I. Guenther-Leopold, R. Weinreich, M. Wohlmuther
New Measurement of the Fe-60 Half-Life
Phys. Rev. Lett., **103**, 072502 (2009)

K. Samec, R. Milenkovic, S. Demetjevs, M. Ashrafi-Nik, A. Kalt
Design of a compact high power neutron source
Nucl. Instr. and Meth., Section A, **606**, Issue 3, 281 (2009)

E. Seravalli, M. de Boer, F. Geurink, J. Huizenga, R. Kreuger, J.M Schippers, C.W.E. van Eijk
2D Dosimetry in a proton beam with a scintillating GEM detector
Phys. Med. Biol., 54, 3755 (2009)

B. Steffen, V. Arsov, G. Berden, W.A. Gillespie, S.P. Jamison, A.M. MacLeod, A.F.G. van der Meer, P.J. Philips, H. Schlarb, B. Schmidt, P. Schmüser
Electro-optic time profile monitors for femtosecond electron bunches at the soft y-ray free-electron laser FLASH
Phys. Rev. Lett., **12**, 032802 (2009)

Y. Suh, Y. Lee ,P. Steimer
A Comparative Study of Medium Voltage Power Converter Topologies for Plasma Torch under Dynamic Operating Conditions
IEEE Transactions on Industrial Electronics, **56**, No. 6 (2009).

T. Tanaka, T. Seike, A. Kagamihata, T. Schmidt, A. Anghel, M. Brügger, W. Bulgheroni, B. Jakob, H. Kitamura
In situ corrections of field errors induced by temperature gradient in cryogenic undulators
Physical Review ST- Accelerators and Beams, **12**, 120702 (2009)

S. Tsujino, F. le Pimpec, J. Raabe, M. Buess, M. Dehler, E. Kirk, J. Gobrecht, A. Wrulich
Static and optical field enhancement in metallic nanotips studied by two-photon photoemission microscopy and spectroscopy excited by picosecond laser pulses
Appl. Phys. Lett. **94**, 093508 (2009)
Selected for the March 16, 2009 issue of Virtual Journal of Nanoscale Science & Technology; Selected for April 2009 issue (Volume 8, Issue 4) of Virtual Journal of Ultrafast Science

D.I. Uhlenhaut, F.H. Dalla Torre, A. Castellero, C.A.P. Gomez, N. Djourelov, G. Krauss, B. Schmitt, B. Patterson and J.F. Loeffler
Structural analysis of rapidly solidified Mg-Cu-Y glasses during room-temperature embrittlement
Philos. Mag. **89**, 233 (2009)

M. J. van Goethem, R. van der Meer, H. W. Reist, J. M. Schippers
Geant4 simulations of proton beam transport through a carbon or beryllium degrader and following beam line
Phys. Med. Biol. **54**, 5831 (2009)

P. van Luijk, H. Faber, J.M. Schippers, S. Brandenburg, J.A. Langendijk, R.P. Coppes
Bath and shower effects in the rat parotid gland explain increased relative risk of parotid gland dysfunction after IMRT
Int. J. Rad. Onc. Biol, Phys **74**, 1002 (2009)

J.M. Schippers
Beam Delivery Systems for Particle Radiation Therapy: Current Status and Recent Developments
Rev. Accelerator Sc. And Techn **2**, 179 (2009)

D. Schumann, J. Neuhausen, J. Eikenberg, M. Ruethi, M. Wohlmuther, P.W. Kubik,. H.-A. Synal, V. Alfimov, G. Korschinek, G. Rugel, Th. Faestermann
Radiochemical analysis of a copper beam dump irradiated with high-energetic protons
Radiochimica Acta **97**, 123 (2009)

F. Weissbach, K. Hencken, D. Kiselev, D. Trautmann
Improved radiative corrections for (e,e'p) experiments: Explicit treatment of kinematical corrections in multiphoton bremsstrahlung
Phys. Rev. C **80**, 024602 (2009)

A. Yu. Konobeyev, U. Fischer, L. Zanini
Analysis of nuclide production in the MEGAPIE target
Nucl. Instr. and Meth., A **605**, 224 (2009)

OTHER PAPERS

J. Grillenberger, M. Seidel
Cyclotron Based High Intensity Proton Accelerators
ICFA Beam Dynamics Newsletter 49, Editors: J.Wang, W.Chou, 61, 2009

J. Patorski, F. Barbagallo, R. Milenkovic, A. Kalt, M. Wohlmuther, S. Dementievs, S. Joray, L. Zanini
Impact of wetting on heat transfer, COOLWETT Experiment Series-Status 3rd International Topical Seminar Coolants and Innovative Reactor Technologies Wetting phenomena in liquid metals and their consequences
Organized within the framework of CEA & JAEA Collaboration and GEDEPEON (Gestion des Dechets et Production d'Energiepar des Options Nouvelles), AIX EN PROVANCE, France, (2009)

J.A. Patorski, F. Barbagallo, A. Kalt, P. Bucher, R. Stieglitz, M. Daubner, F. Fellmoser
Development of HHF IRT-sensors for an experimental determination of local HTC for the MEGAPIE target type LBE cooled beam window. VELLA Final report
European Commission, 6th Framework Program, NUWASTE-2005/6-3.2.3.1-1 Radioactive Waste Management Infrastructures, VELLA JRA3 Deliverable D49
Paul Scherrer Institut, TM- 85-09-13, Switzerland (2009)

J.A. Patorski, F. Barbagallo, A. Kalt, E. Manfrin, R. Stieglitz
Maturity test of High Heat Flux (HHF) InfraRed Thermography (IRT)-sensors for an experimental determination of local heat transfer coefficients (HTC) for the ADS-type MEGAPIE target type beam window
European Commission, 6th Framework Program, NUWASTE-2005/6-3.2.3.1-1 Radioactive Waste Management Infrastructures, VELLA JRA3 Deliverable D48
Paul Scherrer Institut, TM- 85-09-09, Switzerland (2009)

B.D. Patterson (editor)
Ultrafast Phenomena at the Nanoscale: Science Opportunities at the SwissFEL X-ray Laser
PSI Bericht Nr. 09-10 (2009)

A. Plotnikov, E. Mustafin, N. Pyka, A. Smolyakov. Y. Lee
Heating of the electrostatic septum wires by lost U ions
GSI Report, Document ID: ACC_THEORY-report-2009-003, GDS-ID: DOC-2009-Apr-87 (2009)

CONFERENCE PROCEEDINGS

A. Adelmann, Y. Ineichen, C. Kraus, T. Schietinger, J. Yang, S. Russell
The Object Oriented Parallel Accelerator Library (OPAL)
Proc. PAC 2009, Vancouver, Canada (2009)

A. Adelmann, Y. Ineichen, C. Kraus, T. Schietinger, J. Yang, Y. Bi, S. Russell
The Object Oriented Parallel Accelerator Library (OPAL), Design, Implementation and Application
Proc. Computational Accelerator Physics Conference (ICAP) San Francisco, USA (2009)

M. Boege, A. Luedeke, A. Streun, A. Andersson
Ultra-Low Vertical Emittance at the SLS
Proc. PAC 2009, Vancouver, Canada (2009)

B.J. Micklich, F.X. Gallmeier, M Wohlmuther
Comparison of Selected Codes for Calculating Induced Radioactivity at Accelerator Facilities
Nuclear Technology, **168**, 700 (2009)

A. Citterio, M. Dehler, D.M. Treyer, B.Keil, V.Schlott, L. Schulz
Design of a Resonant Stripline Beam Position Pickup for the 250 MeV PSI-XFEL Test Injector
Proc. DIPAC09, Basel, Switzerland, 71 (2009)

J. Chrin, G. Prekas
A Taste of CAFE
Proc. ICALEPCS 2009, Kobe, Japan (2009)

M. Dehler, J.-Y. Raguin, A. Citterio, A. Falone, W. Wuensch, G. Riddone, A. Grudiev, R. Zennaro, A. Samoshkin, D. Gudkov, G. d'Auria, M. Elashmawy
Alignment Monitors for an X Band Accelerating Structure
DIPAC 09, Basel, Switzerland, 47 (2009)

M. Dehler, J.-Y. Raguin, A. Citterio, A. Falone, PSI, Villigen W. Wuensch, G. Riddone, A. Grudiev, R. Zennaro
Synergies between X-Band for Linear Colliders and Light Sources
Proc. X-Band RF Structure and Beam Dynamics Workshop - 44th ICFA Advanced Beam Dynamics Workshop, Cockroft Institute, UK (2009)

P.-A. Duperrex, P. Baumann, S. Joray, D. Kiselev, Y. Lee, U. Mueller
Design & Operation of a Current Monitor under Heavy Heat Load
9th European Workshop on Beam Diagnostics and Instrumentation for Particle Accelerators, Proc. DIPAC 2009, Basel, Switzerland, 336 (2009)

A. Falone, R. Ischebeck, H. Fitze, Y. Kim, M. Pedrozzi, V. Schlott, B. Steffen, L. Stingelin D. Alesini, L. Ficcadenti, L. Palumbo
RF Deflector for Bunch Measurement at Low Energy at PSI
Proc. PAC 2009, Vancouver, Canada (2009)

F. X. Gallmeier, M. Wohlmuther, U. Filges, D. Kiselev, G. Muhrer
Implementation of Neutron Mirror Modeling Capability into MCNPX and Its Demonstration in First Applications
Nuclear Technology **168**, 768 (2009)

R. Ganter, B. Beutner, S. Binder, H.H. Braun, M. Broennimann, M. Dach, T. Garvey, C. Gough, C. Hauri, M. Heiniger, R. Ischebeck, S. Ivkovic, Y. Kim, E. Kirk, F. Le Pimpec, K. Li, R. Luescher, P. Ming, A. Oppelt, M.L. Paraliev, M. Pedrozzi, J.-Y. Raguin, T. Schietinger, T. Schilcher, B. Steffen, L. Rivkin, S. Tsujino, A. Wrulich;
Commissioning of a diode/RF photogun combination
Proc. FEL 2009, Liverpool, UK, 317 (2009)

Y. Kim, B. Beutner, H. Braun, A. Citterio, M. Dehler, A. Falone, R. Ganter, T. Garvey, S. Hunziker, R. Ischebeck, B. Keil, M. Pedrozzi, S. Reiche, T. Schilcher, V. Schlott, B. Steffen
Beam Diagnostics and RF System Requirements for the SwissFEL Facility
Proc. DIPAC 2009, Basel, Switzerland, 427 (2009)

C. Gough, M. Paraliev, S. Ivkovic
Low Emittance Gun for XFEL Application
Proc. Workshop on Polarized Electron Sources, Newport News, USA, Spin Physics, Part **2**, 1104 (2009)

C.P. Hauri, R. Ganter
Gun laser systems for the SwissFEL project
Proc. FEL 2009, Liverpool, UK, 157 (2009)

Y. Ineichen, A. Adelmann, P. Arbenz
A Fast Parallel Poisson Solver on Irregular Domains Applied to Beam Dynamic Simulations
Proc. ICAP 2009, San Francisco, USA (2009)

R. Ischebeck, B. Beutner, V. Schlott, B. Steffen
Screen Monitor Design for the SwissFEL
Proc. DIPAC 2009, Basel, Switzerland, 405 (2009)

M. Ivanyan, V.M. Tsakanov, A. Vardanyan, M. Dehler, T. Schmidt, A. Streun
Impedance of CPMU in SLS Storage Ring
Proc. Proc. PAC 2009, Vancouver, Canada (2009)

F. Jones, W. Herr, T. Pieloni
Self-Consistent Parallel Multi Bunch Beam-Beam Simulation using a Grid-Multiple Method
Proc. PAC, Vancouver, Canada (2009)

B. Kalantari, T. Korhonen
Design and Implementation of a Full-featured Distributed Synchronization System Using Commercial Hardware
Proc. ICALEPCS 2009, Kobe, Japan (2009)

V. Khachatryan, V. Sahakyan, A. Tarloyan, V. Tsakanov, T. Garvey, S. Reiche
PSI XFEL Sensitivity to Main Beam Parameters and Undulator Focusing
Proc. PAC 2009, Vancouver, Canada (2009)

B. Keil
Beam Position Measurement With Sub-Micron Resolution
Proc. DIPAC 2009, Basel, Switzerland, 275 (2009)

D. Kiselev, V. Alfimov, Th. Faestermann, G. Korschinek, P. Kubik, H.-A. Synal, G. Rugel, D. Schumann, S. Teichmann, M. Wohlmuther
Characterization of radioactive waste at PSI
Proc. ARIA 2008, Villigen, Switzerland, PSI Proceeding 09-01, ISSN 1019-0643 (2009)

G. Lambert, J. Gautier, J.P. Goddet, T. Marchenko, G. Rey, M. Ribiere, S. Sebban, F. Tissandier, C. Valentin, P. Zeitoun, M. Fajardo, A. Sardinha, C.P. Hauri
An Intense kHz and Aberration-free Two-colour High Harmonic Source for Seeding FELs from EUV to soft X-ray Range
Proc. FEL 2009, Liverpool, UK, 225 (2009)

Y. Lee, P.-A.Duperrex, D. Kiselev, U. Müller
A Simulation based thermal Design of a New Current Monitor at PSI Proton Accelerator
Proc. PAC 2009, Vancouver, Canada (2009)

K. Manukyan, G.A. Amatuni, A. Sargsyan, V.M. Tsakanov, M. Boege, A. Streun
Analysis of Decoherence Signals at the SLS Storage Ring
Proc. PAC 2009, Vancouver, Canada (2009)

A.C. Mezger, D. Anicic, H. Lutz, M. Gasche, T. Korhonen
Upgrading the PROSCAN Control System to EPICS
Proc. ICALEPCS 2009, Kobe, Japan, 12-16 October 2009

R. Milenković, S. Dementjevs, K. Samec, E. Platacis, A. Zik, A. Flerov, K. Thomsen, E. Manfrin
Time-frequency analysis of coupled structural-hydraulic behavior of the EURISOL liquid metal target mock-up
Proc. EMP 2009, Dresden, Germany, 425 (2009)

G. Muhrer, M. Wilson, Ch. Kelsey, E. Pitcher, F. Gallmeier, M. Wohlmuther
Shield Design of the Materials Test Station's Camera Room
Nuclear Technology **168**, 502 (2009)

F. Müller, S. Hunziker, V. Schlott, B. Steffen, D.M. Treyer, T. Feurer
Ytterbium Fiber Laser for Electro-Optical Pulse Length Measurements at the SwissFEL
DIPAC 2009, Basel, Switzerland, 366 (2009)

A. Oppelt, R. Abela, B. Beutner, B. Patterson, S. Reiche
Design considerations for a THz pump source at the SwissFEL
Proc. FEL 2009, Liverpool, UK, 161 (2009)

H. Okuno, J. Yang, A. Adelmann
Round Beam Formation in the RIBF Cyclotrons
Proc. ICAP 2009, San Francisco, USA (2009)

G.L. Orlandi, B. Beutner, R. Ischebeck, V. Schlott, B. Steffen
Beam Transverse Size Effects in the OTR Spectrum as a High Resolution Diagnostic Tool
Proc. FEL 2009, Liverpool, UK, 153 (2009)

B. Oswald, P. Leidenberger, S. Tsujino
Nano-optics for field emitter arrays Exploratory study to investigate the applicability of nano-optical
5th Workshop on Numerical Methods for Optical Nano Structures, ETH Zürich, Switzerland, (2009)

T. Pal, T. Korhonen
Configuration Management for Software and Firmware at PSI Accelerators
ICALEPCS 2009, Kobe, Japan (2009)

T. Pieloni, W. Herr, J. Qiang
Emittance Growth due to Beam-Beam Effects with a Static Offset in Collision in the LHC
Proc. PAC 2009, Vancouver, Canada (2009)

A. Puzic, B. Kalantari, C. Quitmann, J. Raabe, T. Korhonen
Reconfigurable Data Acquisition System for Time-Resolved Studies in Multibunch Mode of the SLS
ICALEPCS 2009, Kobe, Japan (2009)

D. Reggiani, M. Daum, P.A. Duperrex, G. Dzieglewski, U. Frei, T. Korhonen, A. Mezger, U. Müller, U. Roher
A Macro-Pulsed 1.2 MW Proton Beam for the PSI Ultra Cold Neutron Source
Proc. PAC 2009, Vancouver, Canada (2009)

W. Roser, B. Amrein, O. Morath
Reduction of radioactive waste production of a proton therapy facility
Proc. Swiss Society for Radiation Biology and Medical Physics, Annual Scientific Meeting 2008, 27, ISBN No. 3 908 125 43 X

T. Schietinger
H5PartROOT, a visualization and post-processing tool for accelerator simulations
Proc. ICAP 2009, San Francisco, California, USA (2009)

J.M. Schippers, A. Adelmann, W. Joho, M. Negrazus, M. Seidel, M.K. Stam, H. Homeyer
A novel design of a cyclotron based accelerator system for multi-ion therapy
Proc. HIAT 2009, Venice, Italy (2009)

M. Seidel, A. Mezger
Performance of the PSI High Power Proton Accelerator
Proc. IAEA Conference on Nuclear Research Applications and Utilization of Accelerators, Vienna, Austria (2009)

E. Servalli, M. de Boer, F. Geurink, J. Huizinga, R. Kreuger, J.M. Schippers, C.W.E. van Eijk
A scintillating gas detector for 2D dose imaging in proton, alpha or carbon ion beams for particle therapy
Proc. Biannual ESTRO Meeting, Maastricht, the Netherlands (2009)

B. Steffen, V. Schlott, F. Müller
A Compact Single Shot Electro-Optical Bunch Length Monitor for the SwissFEL
DIPAC 2009, Basel, Switzerland, 263 (2009)

A. Streun, M. Boege, J.T.M. Chrin, A. Luedeke
Correction of Imperfections in the SLS Storage Ring
Proc. PAC 2009, Vancouver, Canada (2009)

A. Streun, N.P. Abreu, M. Boege, F. Mueller, V. Schlott, H. Sigg, G.A. Amatuni, D. Gishyan, K. Manukyan, A. Sargsyan
Low-Alpha Operation of the SLS Storage Ring
Proc. PAC 2009, Vancouver, Canada (2009)

Y. Suh, Y. Lee, H. Park, P. Steimer
A Power Conversion System for AC Furnace with Enhanced Arc Stability
IEEE Energy Conversion Congress and Expo, ECCE 2009, San Jose, California, USA, 2043 (2009)

W. Wagner, M. Seidel, E. Morenzoni, F. Groeschel, M. Wohlmuther, M. Daum
PSI status 2008-Developments at the 590 MeV proton accelerator facility
Nuclear Instruments & Methods in Physics Research, Section A, Accelerators Spectrometers Detectors and associated Equipment, **600**, 5 (2009)

S. M. White, H. Burkhardt, S. D. Fartoukh, T. Pieloni
Optimization of the LHC Separation Bumps Including Beam-Beam Effects
Proc. PAC 2009, Vancouver, Canada (2009).

M. Wittberger, A. Adelmann, P. Arbenz
A Self-Consistent 3D Finite Element Vlasov-Maxwell Solver with Particles
Proc. ICAP 2009, San Francisco, USA (2009)

M. Wohlmuther, F. X. Gallmeier, M. Brugger, S. Roesler
Activation of Trace Elements and Impurities: A New Ansatz for Monte Carlo Calculations
Nuclear Technology **168**, 685 (2009)

J. Yang, Y. Bi, S. An, S. Wei, T. Zhang, A. Adelmann, Y. Lin
Space Charge Simulation on High Intensity Cyclotrons: Code Development and Applications
Proc. PAC 2009, Vancouver, Canada (2009)

A. Yu. Konobeyev, U. Fischer, L. Zanini
New Data Files for the Calculation of Neutron and Proton Induced Radiation Damage Rates in Structural Materials of High Energy Systems
Proc. 14th International Conference on Emerging Nuclear Energy Systems, Ericeira, Portugal (2009)

L. Zanini, A. Aiani
A Neutron Booster for the SINQ Neutron Source Using Thin Fissile Layers
Proc. IAEA Conference on Nuclear Research Applications and Utilization of Accelerators, Vienna, Austria (2009)

INVITED TALKS

A. Adelmann
The Object Oriented Parallel Accelerator Library (OPAL), Design, Implementation and Application
Beam Physics and CASA Seminars and Accelerator Division Seminars, Jefferson Lab, USA,
19 August 2009

A. Adelmann
The Object Oriented Parallel Accelerator Library (OPAL), Design,
Implementation and Application
Accelerator Physics Seminar, Riken, Wako Institute, Japan, 27 November 2009

A. Adelmann
The Object Oriented Parallel Accelerator Library (OPAL), Design, Implementation and Application
CIAE, Beijing, China, 3 December 2009

A. Adelmann
The SwissFEL Project at PSI
CIAE, Beijing, China, 3 December 2009

A. Adelmann
The Object Oriented Parallel Accelerator Library (OPAL), Design, Implementation and Application
Tsinghua University Beijing, Engineering Physics Department, Beijing, China, 18 December 2009

A. Adelmann
The SwissFEL Project at PSI
Tsinghua University Beijing, Engineering Physics Department, Beijing, China, 18 December 2009

C. Baumgarten
The New Compact ECR Proton Source for the PSI Proton Facility
Europ. Cyclotron Progress Meeting ECPM XXXVII, Groningen, the Netherlands,
28-31 October 2009

M. Boege
Fast Orbit Control at the SLS
DELTA, Technische Universitaet Dortmund, Germany, 18 August 2009

M. Boege
Emittance Control at the SLS
XVII ESLS Workshop
DESY, Hamburg, Germany, 26 November 2009

H. Braun
SwissFEL - The PSI Project for a hard X-ray Free Electron Laser Facility
Seminar Sincrotrone Trieste, Italy, 20 October 2009

H. Braun
SwissFEL-The PSI Project for a hard X-ray Free Electron Laser Facility
ANKA Seminar, FZ Karlsruhe, Germany, 30 November 2009

M. Dehler
Beam dynamics in the low energy part of the Low Emittance Gun (LEG)
10th Int. Computational Accelerator Physics Conference, San Francisco, USA,
2 September (2009)

M. Dehler
X band RF structure development at PSI
Accelerator seminar, CANDLE, Yerevan, Armenia, 17 September 2009

M. Dehler
X-FEL X-band structure wake field monitors
CLIC09 workshop, CERN, Switzerland, 14 October, 2009

R. Ganter
Electron Beam Characteristics of a combined Diode – RF electron Gun
High Brightness Electron Beam Workshop, Maui, USA, 17 November 2009

T. Garvey
The Proton Beam Therapy Facility at PSI
Annual Meeting of the American Association of Physicists in Medicine, Anaheim, Ca, USA
27 July 2009

J. Grillenberger
Cyclotron Based High Intensity Proton Accelerators
Workshop on Future Directions for Accelerator R&D at Fermilab
Fermilab, Lake Geneva, USA, 11-13 May 2009

M. Humbel
Gearing the PSI high power proton facility into the 3rd milliampère
XXXVII Europ. Cyclotron Progress Meeting, Groningen, the Netherlands, 28-31 October 2009

R. Ischebeck
X-Ray Science at the Femtosecond to Attosecond Frontier
Synchronization and Longitudinal Diagnostics for XFELs
Los Angeles California, USA, 19 May 2009

R. Ischebeck
Advanced Accelerator Concepts
Kolloquium der LMU und TU München, Germany, 7 May 2009

R. Ischebeck
Beschleuniger jenseits von LHC und ILC
DPG Frühjahrstagung in München, Germany, 10 March 2009

W. Joho
The PSI Accelerator Facilities
Chinese Institute for Atomic Energy, Beijing, 29 October 2009

B. Keil
Beam Position Measurement With Sub-Micron Resolution
DIPAC 2009, Basel, Switzerland, 25-27 May 2009

A. Lüdeke
Methods of Operation Failure Analysis at Light Sources
2nd workshop on Accelerator Reliability (ARW), Vancouver, Canada, 26-30 January 2009

B. Oswald
Computational Electrodynamics for Particle Accelerators
Heidelberg Graduate School of Mathematical and Computational Methods for the Sciences.
Heidelberg University, Heidelberg, Germany 9 June 2009

B. Oswald
Nano-Optics of Field Emitter Arrays; Exploratory Study to investigate the Applicability of Nano-Optiocal Concepts
5th Workshop on Numerical Methods for Optical Nano Structures, ETH Zurich, Switzerland, 7-8 July 2009

B.D. Patterson
Der PSI-XFEL: ein Röntgenlaser, um Atombewegungen zu verfolgen
PSI-ATK Kolloquium, PSI Villigen, Switzerland, 13 January 2009

B.D. Patterson
The PSI-XFEL Project
SIBMAR Conference on Single-Molecule Imaging, Lucerne, Switzerland, 27 January 2009

B.D. Patterson
The PSI-XFEL Scientific Case: 700 eV – 14.4 keV and beyond ...
IRUVX Meeting, Trieste, Italy, 11 March 2009

B.D. Patterson
The X-Ray Free Electron Laser Project at PSI
Physics Seminar, NTNU, Trondheim, Norway, 27 March 2009

B.D. Patterson
The X-Ray Free Electron Laser Project at PSI
SSOM meeting on Laser Applications, Engelberg, Switzerland, 28 April 2009

B.D. Patterson
The X-Ray Free Electron Laser Project at PSI
PSI-Radiochemistry Seminar, PSI Villigen, Switzerland, 8 May 2009

B.D. Patterson
SwissFEL: The X-Ray Free Electron Laser Project at PSI
PSI-LTP Kolloquium, PSI Villigen, Switzerland, 28 May 2009

B.D. Patterson
SwissFEL: The X-Ray Free Electron Laser Project at PSI
SSOM Conference on X-ray Microscopy, Interlaken, Switzerland, 13 July 2009

B.D. Patterson
Condensed Matter Science with Neutrons and X-rays at PSI
Swiss/Austrian Physical Society Meeting, Innsbruck, Austria, 2 September 2009

T. Pieloni
A Parallel Code for Self-Consistent Beam-Beam Simulations for Beams with a large number of Bunches
Int. Computational Accelerator Physics Conference, San Francisco, USA, 2 September 2009.

T. Pieloni
Absorber Development for the CLIC Accelerating Structures
CLIC09 workshop, CERN, Switzerland, 14 October 2009

D. Reggiani
Beam Transverse Phase Space Reconstruction Using MENT
Accelerator Performance Talks, ORNL, Tennessee, USA, 18 September 2009

T. Schietinger
The SwissFEL project at PSI and possible applications in fundamental physics
Swiss Institute for Particle Physics, Annual Meeting, Appenberg, Switzerland, 25 August 2009

T. Schietinger
The SwissFEL project at PSI
Colloquium, Albert Einstein Center for Fundamental Physics, University of Bern, Switzerland, 11 November 2009

J.M. Schippers
The first (almost) 2 year clinical operation of the SC cyclotron and beam lines at PSI's Center for Proton Radiation Therapy
Centre de Protonthérapie d'Orsay, Orsay, France, 14 January 2009

J.M. Schippers
Bestralingsapparatuur voor protonentherapie op PSI
Conferentie Protonentherapie, Technical University Delft, the Netherlands, 29 January 2009

J.M. Schippers
Toekomstige ontwikkelingen in de protonentherapie
Conferentie Protonentherapie, Technical University Delft, the Netherlands, 29 January 2009

J.M. Schippers
Protontherapy at PSI: Physics and Technology for Healthcare
Department of Physics, University of Basel, Switzerland, 24 April 2009

J.M. Schippers
How can particle therapy benefit from magnet technology?
16th Int. Magnetic Measurement Workshop, Bad Zurzach, Switzerland, 27 October 2009

J.M. Schippers
Acquisition and clinical operation of the SC-cyclotron for proton therapy at PSI
LNL-INFN, Legnaro-Padova, Italy, 6 November 2009

J.M. Schippers
Proton Therapy at PSI: High-Tech Research for Healthcare
Refresher course of the school for Health Physics, University of Groningen, Groningen, the Netherlands, 19 November 2009

M. Seidel
Prerequisites for successful high power beam operation
Conference on the SPIRAL 2 project, GANIL, Caen, France, January 26-29 2009

M. Seidel
PSI experience with high power beam handling, activation and radiation protection
European Spallation Source workshop, Bilbao, Spain, 16-18 March 2009

M. Seidel
Performance of the PSI High Power Proton Accelerator
IAEA Conference on Nuclear Research Applications and Utilization of Accelerators, Vienna, Austria, 4-8 May 2009

M. Seidel
The PSI High Intensity Proton Accelerator
J-PARC, Tokai-mura, Japan, 7 July 2009

M. Seidel
Cyclotron Based High Intensity Proton Accelerators
Workshop on Applications of High Intensity Proton Accelerators, Fermilab, USA, 20 October 2009

L. Stingelin
RF-Developments at PSI
13 ESLS-RF Meeting, DESY, Hamburg, Germany, 1 October 2009

M. Wittberger
Self-Consistent 3D Finite Element Vlasov-Maxwell Solver with Particles
ICAP 2009, San Francisco, USA, 31 August – 4 September 2009

M. Wohlmuther
MEGAPIE on the Way to PIE
2009 Winter Meeting of the ANS, Washington, DC, USA, 15-19 November 2009

L. Zanini
Accelerator Driven Systems for Nuclear Waste Transmutation: Recent Advances
University of Torino, Italy, 27 April 2009

D. Zimoch
Writing EPICS Drivers
EPICS Workshop, National Fusion Research Institute, Daejeon, Republic of Korea, 27-29 July 2009

D. Zimoch
AsynDriver Introduction
EPICS Workshop, National Fusion Research Institute, Daejeon, Republic of Korea, 27-29 July 2009

D. Zimoch
Channel Access Gateway
EPICS Workshop, National Fusion Research Institute, Daejeon, Republic of Korea, 27-29 July 2009

D. Zimoch
Auto Save and Restore
EPICS Workshop, National Fusion Research Institute, Daejeon, Republic of Korea, 27-29 July 2009

D. Zimoch
Siemens S7 PLC Communication
EPICS Workshop, National Fusion Research Institute, Daejeon, Republic of Korea, 27-29 July 2009

WORKSHOPS (organized by GFA and SwissFEL)

A. Adelmann
Co-Organizer
HPC Workshop
EPFL Lausanne, Switzerland, 7-8 September 2009

B. Keil
Organizer
European XFEL BPM and Beam Stability Workshop
Paul Scherrer Institut, Villigen, Switzerland, 27-28 August 2009

B. Patterson, M. Bugmann
Organizers
PSI-XFEL Science Workshop, Ultrafast Biochemistry
Pharmazentrum, University Basel, Switzerland, 28 January 2009

B. Patterson, M. Bugmann
Organizers
PSI-XFEL Science Workshop, Novel XFEL Ideas and Challenges
Paul Scherrer Institut, Villigen, Switzerland, 26-27 February 2009

B. Patterson, M. Bugmann
Organizers
PSI-XFEL Science Workshop, Time-Resolved Spectroscopy of Correlated Electron Materials
University of Zurich, Zurich, Switzerland, 6 March 2009

B. Patterson, A. Oppelt, S. Bacher
Organizers
Workshop for a THz source at the SwissFEL
Park-Hotel, Bad Zurzach, Switzerland, 10 December 2009

S. Sanfilippo, M. Bugmann, J. Duppich, M. Negrazus, V. Vrankovic, C. Vock
Organizers
IMMW 16 – Int. Magnetic Measurement Workshop
Bad Zurzach, Switzerland, 26-29 October 2009

V. Schlott, M. Bugmann, J. Chrin, M. Dehler, G. Marinkovic, P. Pollet, Th. Schilcher, C. Vock
Organizers
DIPAC 2009, European Workshop on Beam Instrumentation for Particle Accelerators
Hotel Mercure, Basel, Switzerland, 25-27 May 2009

R. Abela, H. Braun, M. Bugmann, S. Egli, D. Vermeulen
Topical Workshop on IT Infrastructure and Control Systems for SwissFEL
Schloss Böttstein, Böttstein, Switzerland, 15 December 2009

BACHELOR / MASTER THESES

A. De Simone
Neutronic Design of a Spallation Neutron Source and Study of Medical Applications
Bachelor thesis, University of Torino, Italy, October 2009
Thesis Advisor: Dr. L. Zanini (PSI)

P. Käppeli
Experimentelle Untersuchung zur Detektion von Kavitationsgeräusch und strömungserregten Schwingungen
Bachelor Thesis, FHNW-ITFE Windisch, Switzerland, 14. August 2009
Thesis advisors: Prof. Dr. C. Gossweiler (FHNW Windisch), Dr. R. Milenković (PSI), Dr. S. Dementevs (PSI)

Anouk ter Brugge
Beam Dynamics Studies for the Central Region of a 250 MeV Superconducting Cyclotron
Bachelor Thesis at Saxion Hogeschool Enschede, the Netherlands, January 2009
Thesis advisor: Dr. J.M. Schippers (PSI)

Christina Wouters
Central region studies of the 250 MeV SC cyclotron for proton therapy
Master Thesis, University of Groningen, the Netherlands, December 2009
Thesis advisor: Dr. J.M. Schippers (PSI)

DISSERTATIONS

C. Bracco
Commissioning Scenarios and Tests for the LHC Collimation System
Thesis No. 4271 / EPFL Lausanne, Switzerland 2009
Thesis advisors: Prof. Dr. A. Wrulich (EPFL, PSI)
Prof. Dr. A. Bay (EPFL)
Prof. Dr. L. Rivkin (EPFL, PSI)
Dr. R. Assmann (CERN)

D. Martoccia
Structural Studies of h-BN and Graphene Single-Layers on Transition-Metal Surfaces
Thesis, MNF Fakultät, University of Zurich 2009
Thesis advisors: Prof. B.D. Patterson (PSI, Univ ZH)
Prof. H. Keller (Univ ZH)

M. Pojer
A finite element model of the LHC dipole cold mass with hysteretic, non-linear behavior and single turn description : towards the interpretation of magnet quenches
Thesis No 4259 / EPFL, Lausanne, Switzerland 2009
Thesis advisors: Prof. Dr. A. Wrulich (EPFL, PSI)
Prof. Dr. A. Bay (EPFL)
Prof. Dr. L. Rivkin (EPFL, PSI)
Dr. W. Scandale (CERN)

G. Sterbini
An early separation scheme for the LHC luminosity upgrade
Thesis No 4574 / EPFL, Lausanne, Switzerland, 2009
Thesis advisors: Prof. Dr. L. Rivkin (EPFL, PSI)
Dr. J.-P. Koutchouk (CERN)

B. Salvant
Impedance model of the CERN SPS and aspects of LHC single-bunch stability
Thesis No 4585 / EPFL, Lausanne, Switzerland, 2009
Thesis advisors: Prof. Dr. L. Rivkin (EPFL, PSI)
Dr. E. Métral (CERN)

J.J. Yang
3D Simulation Study of Space Charge Effects on High Intensity Cyclotrons
Thesis, Tsinghua University, Beijing, China, 2009
Thesis advisors: Prof. Dr. C.Tang (Tsinghua University, Beijing)
Prof. Dr. T. Zhang (Chinese Institute of Atomic Energy, Beijing)
Dr. A. Adelmann (PSI)

Memberships in external Committees

A. Adelmann
- Speedup Society (treasury)
- CSCS "Horizon Project" Steering Committee
- Program Committee ICFA High Brightness Beam Dynamics Workshop
- International Super Computing Conference (ISC), Program Committee
- Expert for Mathematics "Maturitaets Exams"
- Innovative and Novel Computational Impact on Theory and Experimentation (INCITE), Committee US

M. Boege
- Machine Advisory Committee Taiwan Photon Source (TPS), NSRRC, Taiwan

H. Braun
- DESY, Machine Advisory Committee
- European XFEL, Machine Advisory Committee
- PAL IAC, Korea

T. Garvey
- International Linear Accelerator Conference Program Committee
- International Linear Accelerator Conference Organising Committee
- French (CEA/CNRS) Committee of Accelerator Experts (ComEA)
- European Committee for Future Accelerators
- Scientific and Technical Committee of the IRFU/CEA Accelerator Group
- CTF3/CLIC Collaboration Board
- EuCARD Governing Board

T. Korhonen
- Int. Conference on Accelerator and Large Experimental Physics Control Systems (ICALEPCS 2009), Program Committee

J.A. Patorski

- Member of the Thermosense Steering Committee; USA , SPIE Defense, Security + Sensing

W. Roser

- Swiss Society for Radiation Biology and Medical Physics, Board Member
- Comité Electrotechnique Suisse (CES), Member of TC 62
- Member of IEC Technical Committee 62C, Working Group 1

L. Rivkin

- CERN Accelerator School, Advisory Committee
- CERN, CLIC CTF3 Collaboration Board
- DESY, Machine Advisory Committee (Chairman)
- Joint Universities Accelerator School, Program Committee

T. Schietinger

- European Committee for Future Accelerators (ECFA)

J.M. Schippers

- TRIUMF Accelerator, Advisory Committee
- Chairman of subcommittee “particle dosimetry” of the Netherlands Commission on Radiation Dosimetry
- Advisory committee on technical developments for proton therapy facilities, IBA, Louvain la Neuve, Belgium
- Advisory committee on the new cyclotron and its commissioning and acceptance of the Legnaro National Laboratory of the INFN (Istituto Nationale di Fisica Nucleare), Legnaro, Italy
- Advisory committee on the new 400 MeV/n carbon cyclotron and its commissioning and acceptance, at the ARCHADE project, Caen, France

L. Schulz

- SESAME, Jordan, Technical Advisory Committee

M. Seidel

- Int. Conferences on Cyclotrons and their Applications: Int. Organizing Committee + Program Committee
- Accelerator Technology Advisory Committee for the Chinese Neutron Spallation Source (CSNS)
- Series ICFA Workshops on High Brightness, High Intensity Hadron Beams, Scientific Advisory Committee
- European Cyclotron Progress Meetings, Scientific Advisory Committee
- OECD/NEA Int. Workshop on Technology and Components of Accelerator Driven Systems (TCADS), Scientific Advisory Committee
- Swiss Vacuum Society, Member of Managing Board

M. Wohlmuther

- Program Committee of the International Conference on Neutron Scattering ICNS09, subcommittee on Facilities and Source Development
- Scientific Committee of SATIF 10, Tenth Meeting of the Task-Force on Shielding Aspects of Accelerators, Targets and Irradiation Facilities

LIST OF PUBLICATIONS 2009

Logistics

Eikenberg, J., Jaeggi, M., Beer, H. Rüthi, M. and Zumsteg, I. (2009)
Separation techniques for low-level determination of actinides in soil samples.
Appl. Radiation Isotopes 67, 776-780.

Fabbrizio, A., Schmidt, M., Günther, D. and Eikenberg, J. (2009)
Experimental determination of Ra mineral / melt partitioning for feldspars and ^{226}Ra disequilibrium crystallization ages of plagioclase and alkali-feldspar.
Earth Planet. Sci. Lett. 280, 137 – 148.

Jaeggi, M. and Eikenberg, J. (2009)
Separation of ^{90}Sr from radioactive waste matrices – microwave versus fusion decomposition.
Appl. Radiation Isotopes 67, 765-769.

Jaeggi, M., Ruethi, M. and Eikenberg, J. (2009)
Method for Fe-55 and Ni-63 determination by LSC in radioactive waste.
Radiocarbon (LSC 2008, Advances in Liquid Scintillation Spectrometry, Eds. J. Eikenberg, M. Jaeggi, H. Beer and H. Baehrle, 31 – 39.

Schumann, D. Neuhasen, J. Eikenberg, J., Rüthi, M., Kubik, P., Synal, H.-A., Aflimov, V., Korschinek, G., Rugel, G. and Faestermann, T. (2009)
Radiochemical analysis of a copper beam dump irradiated with high-energetic protons.
Radiochim. Acta 97, 123-131.

Silari, M., Agosteo, S., Beck, P., Bedogni, R., Cale, E., Caresana, M., Domingo, C., Donadille, L., Dubourg, N., Esposito, A., Fehrenbacher, G, Fernandez, F., Ferrarini, M., Fiechtner, A., Fuchs, A., Garcia, M.J., Golnik, N., Gutermuth, F., Khurana, S., Klages, Th., Latocha, M., Mares, V., Mayer, S., Radon, T., Reithmeier, H., Rollet, S., Roos, H., Rühm, W., Sandrim, S., Schardt, D., Simmer, G., Spurny, F., Trompier, F., Villa-Grasa, C., Weitzenegger, E., Wiegel, B., Wielunski, M. and Wissmann, F.,
Intercomparison of radiation protection devices in a high-energy stray neutron field. Part III: Instrument response,
Radiation Measurements, Volume 44, pp. 673–691, 2009.

Temiz, U., Gökten, E. and Eikenberg, J. (2009)
U/Th dating of fissure ridge travertines from the Kisehir region (Central Anatolia Turkey): structural relations and implications for the Neotectonic development of the Anatolian block.
Geodynamica Acta 22, 201 - 213.

Wernli, C.
Individual Monitoring at Accelerator Centres.
Radiat. Prot. Dosim. Vol. 137, No. 1-2, 2009.

S. Mayer, H. Rauch, P. Geltenbort, Philipp Schmidt-Wellenburg, P. Allenspach and G. Zsigmond
New aspects for high intensity neutron beam production.
Nucl. Instr. and Meth. A 608, (2009) 434-439.

CONFERENCE, WORKSHOP AND SEMINAR CONTRIBUTIONS

U. Frommherz, J. Raabe, B. Watts, R. Stefani, U. Ellenberger (2009)
Higher Order Suppressor (HOS) for the PolLux Microspectroscope Beamline of the Swiss Light Source SLS
Proceedings of the SRI international Conference – Melbourne (Australia) – September 2009


56
60
64

◀ The zero-power research reactor PROTEUS (viewed from above), which is used for experimental reactor physics investigations.

PAUL SCHERRER INSTITUT

PSI

Paul Scherrer Institut, 5232 Villigen PSI, Switzerland
Tel. +41 (0)56 310 21 11, Fax +41 (0)56 310 21 99
www.psi.ch