Dr. Benedikt Rösner

- Profound Experience in XFEL Experiments
- Wide Expertise in X-ray Spectroscopy
- Expert in Diffractive X-ray Optics
- Numerous International Collaborations and Research Projects

Research Activities

Simultaneous single shot, time-resolved demagnetization **dynamics at two energies**
Generation of **optical vortices** in the extreme ultraviolet
Creation and metrology of **X-ray transient gratings**
Spectroscopy at free electron lasers using beam splitters for **normalization of SASE modes**
New experimental schemes in **RIXS** to introduce **energy or time dispersion**
Soft X-ray microscopy with **7 nm spatial resolution for magnetic imaging**
Spin-crossover in iron(II)-complexes

https://www.psi.ch/lmn/benedikt-roesner

Key Skills

Scientific skills:

Profound expertise in XFEL experiments

- Frequent participation in beamtimes
- **XAS, RIXS, fs dynamics, X-ray transient gratings, optical vortices, beam profiling, scattering experiments**
- Currently preparing four FEL beamtimes

Comprehensive knowledge in **X-ray microscopy and spectroscopy**
Expert in **nanolithography, nanofabrication and diffractive X-ray optics**
Successful planning and performance of several **experiments at large scale facilities as Principal Investigator**
International collaborations and research projects, existing network in the field
Successful in **publishing and proposal writing**

Computational skills: comprehensive knowledge in state-of-the-art image and data processing software

C	basic programming skills
MatLab	advanced skills and solution-based programing especially in data processing
LabView	basic knowledge without programing practise
Phyton	basic knowledge and programing of small scripts
Linux	use on a regular basis in our lab

Language skills:

German	indigenous speaker, good comprehension of Swiss German
English	excellent knowledge of written and spoken English
Polish	advanced knowledge of written and spoken Polish

Ambitions to learn French and Italian

Miscellaneous: ***Certified Ambulance Officer***

Scientific Career

01/2016 up to now	Scientist within the Laboratory for Micro- and Nanofabrication at the Paul Scherrer Institut in Switzerland
10/2011 – 12/2015	PhD at the Friedrich-Alexander-Universität Erlangen-Nürnberg ***Magna cum laude***
03/2013	**Hercules School Grenoble** **Dedicated training on synchrotron radiation and neutron scattering**

Academic Background

10/2006 – 10/2011	Chemistry studies at the Friedrich-Alexander-Universität Erlangen-Nürnberg
09/2011	Graduation as Master of Science with an excellent degree of 1.1 Transport Properties of Nanostructured Thin Films (rated with 1.0)
07/2010 – 01/2011	Exchange semester at the University of Wollongong in Australia
08/2009	Graduation as Bachelor of Science Self-Organized Microspheres as Templates for Controlled Ag-TCNQ Growth (rated with 1.3)

Scientific Societies & Academic Programs

Deutsche Physikalische Gesellschaft (DPG)

Graduate School Molecular Science (GSMS)

Fellow in the Graduate Course (GRK 1896)
"In-Situ Microscopy with Electrons, X-rays and Scanning Probes"

PUBLICATION RECORD

2018

1. **Diffractive X-ray Optics for Synchrotrons and Free-Electron Lasers**
   C. David, B. Rösner, F. Döring, V. A. Guzenko, F. Koch, M. Lebugle, F. Marschall, G. Seniutinas, J. Raabe, B. Watts, D. Grolimund, Z. Yin, M. Beye, S. Techert, J. Viefhaus, G. Falkenberg, C. Schroer
   Microscopy and Microanalysis 24 (Suppl. 2), **2018**, 264-265
   https://doi.org/10.1017/S1431927618013673

2. **1D-Full Field Microscopy of Elastic and Inelastic Scattering with Transmission off-axis Fresnel Zone Plates**
   F. Döring, F. Marschall, Z. Yin, B. Rösner, M. Beye, P. Miedema, K. Kubiček, L. Glaser, D. Raiser, J. Soltau, V. A. Guzenko, J. Viefhaus, J. Buck, M. Risch, S. Techert, C. David
   Microscopy and Microanalysis 24 (Suppl. 2), **2018**, 182-183
   https://doi.org/10.1017/S1431927618013260

3. **STXM_deconv – a MATLAB script for the Deconvolution of STXM Images**
   J. L. Ornelas, B. Rösner, A. Späth, R. H. Fink
   Microscopy and Microanalysis 24 (Suppl. 2), **2018**, 120-121
   https://doi.org/10.1017/S1431927618012990

4. **7 nm Spatial Resolution in Soft X-ray Microscopy**
   B. Rösner, F. Koch, F. Döring, V. A. Guzenko, M. Meyer, J. L. Ornelas, A. Späth, R. H. Fink, S. Stanescu, S. Swaraj, R. Belkhou, B. Watts, J. Raabe, C. David
   Microscopy and Microanalysis 24 (Suppl. 2), **2018**, 270-271
   https://doi.org/10.1017/S1431927618013697

5. **Extreme-Ultraviolet Vortices from a Free-Electron Laser**
   P. R. Ribič, B. Rösner, D. Gauthier, E. Allaria, F. Döring, L. Foglia, L. Gianessi, N. Mahne, M. Manfredda, C. Masciovecchio, R. Mincigrucci, N. Mirian, E. Principi, E. Roussel, A. Simoncig, S. Spampinati, C. David, G. de Ninno
   Microscopy and Microanalysis 24 (Suppl. 2), **2018**, 292-293
   https://doi.org/10.1017/S1431927618013806

6. **In-operando soft X-ray microspectroscopy of organic electronic devices**
   R. H. Fink, B. Rösner, X. Du, A. Späth, M. Johnson, T. Hawly, B. Watts, J. Raabe, L. Gregoratti, M. Amati
   Microscopy and Microanalysis 24 (Suppl. 2), **2018**, 424-425
   https://doi.org/10.1017/S143192761801437X

7. **Chemical changes in NEXAFS of hybrid organic-inorganic resists upon exposure**
   R. Fallica, B. Watts, B. Rösner, G. della Gustina, L. Brigo, G. Brusatin, Y. Ekinci
   Nanotechnology 29, **2018**, 36LT03
   https://doi.org/10.1088/1361-6528/aaccd4

8. **Exploiting Atomic Layer Deposition for Fabricating Sub-10 nm X-ray Lenses**
   B. Rösner, F. Koch, F. Döring, J. Bosgra, V. A. Guzenko, E. Kirk, M. Meyer, J. L. Ornelas, R. H. Fink, S. Stanescu, S. Swaraj, R. Belkhou, B. Watts, J. Raabe, C. David
   Microelectronic Engineering 191, **2018**, 91-96
   https://doi.org/10.1016/j.mee.2018.01.033

9. **Sub-10 nm Electron and Helium Ion Beam Lithography Using a Recently Developed Alumina Resist**
   A. Cattoni, D. Mailly, O. Dalstein, M. Faustini, G. Seniutinas, B. Rösner, C. David
   Microelectronic Engineering 193, **2018**, 18-22
   https://doi.org/10.1016/j.mee.2018.02.015

10. **Nanoimprint Stamps with Ultra-High Resolution: Optimal Fabrication Techniques**
    M. Graczyk, A. Cattoni, B. Rösner, G. Seniutinas, A. Kvennefors, A. Löfstrand, D. Mailly, C. David, I. Maximov
    Microelectronic Engineering 190, **2018**, 73-78
    https://doi.org/10.1016/j.mee.2018.01.008

2017

11. **High Resolution Beam Profiling of X-ray Free Electron Laser Radiation by Polymer Imprint Development**
B. Rösner, F. Döring, P. R. Ribič, D. Gauthier, E. Principi, C. Masciovecchio, M. Zangrando, J. Vila-Comamala, G. de Ninno, C. David
Optics Express 25, **2017**, 30686-30695
https://doi.org/10.1364/OE.25.030686

12. **Extreme-Ultraviolet Vortices from a Free-Electron Laser**
P. R. Ribič, B. Rösner, D. Gauthier, E. Allaria, F. Döring, L. Foglia, L. Gianessi, N. Mahne, M. Manfredda, C. Masciovecchio, R. Mincigrucci, N. Mirian, E. Principi, E. Roussel, A. Simoncig, S. Spampinati, C. David, G. de Ninno
Physical Review X 7, **2017**, 031036
https://dx.doi.org/10.1103/PhysRevX.7.031036

13. **Transmission zone plates as analyzers for efficient parallel 2D RIXS-mapping**
F. Marschall, Z. Yin, M. Beye, J. Buck, F. Döring, V. A. Guzenko, K. Kubicek, J. Rehanek, D. Raiser, B. Rösner, A. Rothkirch, S. T. Veedu, J. Viefhaus, C. David, S. Techert
Scientific Reports 7, **2017**, 8849
https://dx.doi.org/10.1038/s41598-017-09052-0

14. **Zone plates as imaging analyzers for resonant inelastic x-ray scattering**
F. Marschall, D. McNally, V. A. Guzenko, B. Rösner, M. Dantz, X. Lu, L. Nue, V. Strocov, T. Schmitt, C. David
Optics Express 25, **2017**, 15624
https://dx.doi.org/10.1364/OE.25.015624

15. **Interlaced zone plate optics for hard X-ray imaging in the 10 nm range**
I. Mohacsi, I. Vartiainen, B. Rösner, M. Guizar-Sicairos, V. A. Guzenko, I. McNulty, R. Winarski, M. V. Holt, C. David
Scientific Reports 7, **2017**, 43624
https://dx.doi.org/10.1038/srep43624

16. **In-operando studies of Ag-TCNQ nanocrystals using Raman and soft x-ray microspectroscopy**
B. Rösner, U. Schmidt, R. H. Fink
Journal of Physics: Conference Series 849, **2017**, 012016
https://dx.doi.org/10.1088/1742-6596/849/1/012016

2016 and before

17. **Switching behaviour of individual Ag-TCNQ nanowires: An in situ transmission electron microscopy study**
K. Ran, B. Rösner, B. Butz, R. H. Fink, E. Spiecker
Nanotechnology 27, **2016**, 425703
https://dx.doi.org/10.1088/0957-4484/27/42/425703

18. **Reversible Photoswitching of a Spin-Crossover Molecular Complex in the Solid State at Room Temperature**
B. Rösner, M. Milek, A. Witt, B. Gobaut, P. Torelli, R. H. Fink, M. M. Khusniyarov
Angewandte Chemie Int. Ed. 54, **2015**, 12976-12980
https://dx.doi.org/10.1002/anie.201504192

19. **A microspectroscopic insight into the resistivity switching of individual Ag-TCNQ nanocrystals**
B. Rösner, K. Ran, B. Butz, U. Schmidt, E. Spiecker, R. H. Fink
Physical Chemistry Chemical Physics 17, **2015**, 18278-18281
https://dx.doi.org/10.1039/c5cp02207j

20. **Nanomorphology in thin films of acetamide end-functionalised quaterthiophene**
N. Zeilmann, B. Rösner, A. Späth, U. Schmidt, R. H. Fink
Thin Solid Films 583, **2015**, 108-114
https://dx.doi.org/10.1016/j.tsf.2015.03.066

21. **Dispersion and Characterization of Arc Discharge Singe-Walled Carbon Nanotubes - Towards Conducting Transparent Films**
B. Rösner, D. M. Guldi, J. Chen, A. I. Minett, R. H. Fink
Nanoscale 6, **2014**, 3695-3703
https://dx.doi.org/10.1039/C3NR05788G

22. **Employing microspectroscopy to track charge trapping in operating pentacene OFETs**
B. Rösner, N. Zeilmann, U. Schmidt, R. H. Fink
Organic Electronics 15, **2014**, 435-440
https://dx.doi.org/10.1016/j.orgel.2013.12.002

23. **The role of solvation effects in the growth of TCNQ-based charge-transfer salts**
B. Rösner, A. Späth, R. H. Fink
Journal of Crystal Growth 380, **2013**, 34-38
https://dx.doi.org/10.1016/j.jcrysgro.2013.05.031

24. **Oxidation-driven self-assembly gives access to high-nuclearity molecular copper vanadium oxide clusters**
J. Forster, B. Rösner, R. H. Fink, L. C. Nye, I. Ivanovic-Burmazovic, K. Kastner, J. Tucher, C. Streb
Chemical Science 4, **2013**, 418-424
https://dx.doi.org/10.1039/C2SC20942J

25. **Tuning the light absorption of vanadium clusters**
Johannes Forster, Benedikt Rösner, Marat M. Khusniyarov, Carsten Streb,
Chemical Communications 47, **2011**, 3114-3116
http://dx.doi.org/10.1039/c0cc05536k