PAUL SCHERRER INSTITUT

NES Colloquium

Friday, 12 February 2016, 11:00 - 12:00, OSGA/EG06

LTH: Laboratory for Thermal-Hydraulics

Prof. Dr. H. M. Prasser, PSI & ETHZ

The mitigation of severe accidents in nuclear power plants encompasses ultimate measures to avoid or reduce releases of radioactive material to the environment. Due to the complex character of the processes occurring during core damage in the reactor and in the containment, the research in this field is very multidisciplinary. In this field, the LTH is specialized on the behavior of hydrogen in the containment as well as on generation, transport and retention of radioactive gases and aerosols. Concerning the prevention of core damage, pioneering research contributing to the development of passive safety systems was shifted towards fundamental fluid dynamic modeling and simulation of safety relevant processes. The working horse to reflect the processes that are coupled with flow fields is the method of Computational Fluid Dynamics (CFD). By a shift from empirical models to simulations based on a fundamental description of the flow field, the robustness of predictions is increased, which is converted into a safety gain by applying the results to plant analyses and to the design of Severe Accident Management systems and measures.

The presentation will give examples on high-resolution boiling simulations, hydrogen behavior in the containment, aerosol transport, scrubbing and deposition, and explain experiments performed in the laboratory to provide data for the model development and validation.