



The Paul Scherrer Institute is with 1400 employees the largest research centre for the natural and engineering sciences in Switzerland and a worldwide leading user laboratory. Its research activities are concentrated on the main topics structure of matter, energy and environmental research as well as human health.

The Group Material Science and Simulations (MSS, <http://mss.web.psi.ch/>) part of the Department Research with Neutrons and Muons (NUM) performs research in the structural and mechanical properties of metals, alloys and composites using in-situ testing facilities at the Neutron Spallation Source (SINQ) and at the Swiss Light Source (SLS), meanwhile exploiting synergies with computational modelling.

For several projects involving in-situ testing at the Swiss Light Source we are looking for

3 PhD Students

Structural and Mechanical Properties of Metallic Microstructures Studied by In-Situ X-ray Diffraction

Your tasks

Project 1:

This research is part of a collaboration between the Paul Scherrer Institute, the Max-Planck-Institute in Düsseldorf and the University of Erlangen. The main objective is to develop knowledge on the interplay between the deformation mechanisms in nanocrystalline metals. You will perform transient experiments in the laboratory and in-situ mechanical testing during X-ray diffraction at the Swiss Light Source. You will also use basic microscopy methods to characterize the microstructure of the materials under investigation. The outcome of this research will be used in constitutive models.

Project 2:

This research is part of a collaboration between the Paul Scherrer Institut, the University of Applied Sciences and Arts Northwestern Switzerland and ABB Switzerland Ltd. Corporate Research. The main objective is to investigate the microstructure and properties of porous sintered nano-silver layers and to develop lifetime prediction models for sintered die-attachments. You will help in the development of miniaturized testing device, which you will use to perform in-situ temperature-dependent shearing and creep tests at the Swiss Light Source. You will perform thermal cycling tests, study the failure mechanisms and characterize the microstructure. You will work in close collaboration with the partners responsible for the predictive modelling. The outcome of this research has potential to be directly implemented at industrial level.

Project 3:

The research is part of a collaboration between the Paul Scherrer Institut and the Max-Planck-Institute in Düsseldorf. The overall goal is to develop an experimentally validated computational method to simulate cyclic plastic deformation. You will help with the development of a miniaturized shearing machine, which you will use for in-situ fatigue tests during X-ray diffraction at the Swiss Light Source. You will work in close collaboration with a PhD student who will perform in-depth microscopy experiments. The results will be compared with advanced crystal plasticity simulations performed by a third PhD student.

Your profile

- You hold a Master degree in physics or materials science
- Experience in mechanical testing and/or diffraction techniques is of advantage
- Excellent communication skills in English, knowledge of German is welcome
- You enjoy working in an international team

You will be registered as a PhD Student at the Swiss Federal Institute of Technology EPFL in Lausanne, while the practical work will be carried out at PSI.

For further information please contact Prof. Dr Helena Van Swygenhoven, phone +41 56 310 29 31.

Please submit your application online (including list of publications and addresses of referees) <http://www.psi.ch/pa/offenstellen/0203-1> for the position as PhD Student (index no. 3402-02).

Paul Scherrer Institut, Human Resources, Lea Sutter, 5232 Villigen PSI, Switzerland
www.psi.ch

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