The MPI Semiconductor Laboratory and the Max-Planck-Institute for Extraterrestrial Physics announce

Diploma and PhD Theses

with topics in

Calibration and Response Modeling of the DSSC Detector for the European XFEL

The MPI semiconductor laboratory (MPI-HLL) is a joint facility of the Max-Planck-Institutes for Extraterrestrial Physics and for Physics. The laboratory designs, builds, and qualifies Si detectors for cutting edge experiments in astronomy, high-energy particle physics, and more recently photon science at 4th generation light sources (free electron lasers, FELs). MPI-HLL is located at the Siemens Campus in München-Neuperlach and operates a clean room furnished with state-of-the-art Si processing technology and well equipped test facilities. In addition, there are powerful computing facilities for detector simulation, modeling, and data analysis. The international staff includes about 100 scientists, engineers, and students.

MPI-HLL is leading an international consortium that develops a 1 Megapixel X-ray detector system, DSSC (DEPFET Sensor with Signal Compression), for experiments at the European XFEL facility under construction at DESY, Hamburg. XFEL will be the most brilliant 4th generation light source in the world. It is scheduled to commence scientific operation in 2015. A large variety of experiments are planned, including coherent diffraction imaging of single particles, atom clusters, and bio-molecules, investigations of small quantum systems, investigations of the dynamics of nano-systems and biological objects down to femtosecond resolution, and many more. To make these experiments possible, the DSSC consortium is developing an entirely new instrument with non-linear compression of the signal charge at the input of the first amplifying device. The design goal is to achieve at the same time very good noise performance for single photon detection and high dynamic range for detecting – per pixel – up to about 6000 photons of energy 1 keV. In addition, the DSSC must achieve a frame rate of 5 MHz.

Exploitation of the unique capabilities of the DSSC for experiments at XFEL requires the development of an accurate model, the so-called response, of the detector to incident X rays through calibration measurements and physical modeling – which is the focus of the thesis projects. Applicants for a PhD thesis must have a Master’s Degree in Physics. The theses require experimental skill and experience in data analysis as well as analytical, numerical, and Monte Carlo modeling of detectors. It is also necessary to become familiar with the scientific experiments and goals of XFEL.

The salary for a PhD position is set according to the guidelines of the Max-Planck Society. Funding for a PhD thesis is usually limited to three years.
Contact:

Prof. Dr. Lothar Strüder  
Tel 089 / 83 94 00-41  
Email lts@hll.mpg.de

MPI Halbleiterlabor  
(Siemens Campus München-Neuperlach)  
Otto-Hahn-Ring 6  
81739 München

Dr. Georg Weidenspointner  
Tel 089 / 83 94 00-72  
Email ggw@hll.mpg.de

Dr. Matteo Porro  
Tel 089 / 83 94 00-30  
Email map@hll.mpg.de