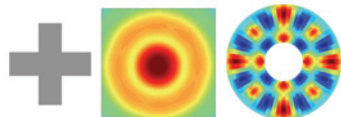


Editorial



Dear colleagues,

An important milestone for the realization of the new SwissFEL facility was reached on the 24th of August 2010, when the core of the new facility, the 250 MeV injector, was set into operation at the Paul Scherrer Institute. This part will be used to develop and test new schemes in accelerator physics as well as diagnostics and undulators. The SwissFEL facility should start user operation in 2017. As we can see already, the experiments performed at FLASH (Hamburg) and LCLS (Stanford) are opening the door to discoveries in many areas of current research that cannot be obtained using existing methods.



For this reason the SwissFEL Photonics Group is now developing novel measurement methods for use with the X-ray free electron laser. These include a) a demonstration of ultrafast initiation of chemical reactions using high-energy pulses of terahertz radiation – for future THz pump / XFEL probe experiments, and b) exploiting correlated scattering to determine the structure of biomolecules in solution. Regarding project b), the Figure shows the simulated average scattering (central panel) and the cross-correlation scattering (right-hand panel) from randomly oriented 4-fold symmetric structures (left-hand panel). A robust method is being developed to extract the structure from the measured cross-correlation.

Rafael Abela on behalf of the PSI SwissFEL team

Announcement: PSI Summer School on Condensed Matter Research



The theme for this year's summer school (August 13-19) is dedicated to **probing phase transitions using photons, muons and neutrons**. Phase transitions are not only a well known fact of everyday life, but also an important field of current research and of technological applications.

In this summer school more than 20 world-class experts will introduce the different aspects of phase transitions from an experimental and theoretical point of view.

Following the school a practical training is offered at PSI (August 20-22). It will allow a limited number of participants to get hands-on experience with state-of-the-art instrumentation using photons, neutrons and muons.

More details: <http://indico.psi.ch/event/psi-summer-school-2011>.

Research highlight

LaAlO₃ - Buckling under pressure to hand over the charges

S. A. Pauli et al., *Phys. Rev. Lett.* **106**, 036101 (2011)

In this paper, we report on the change in the atomic structure of the conducting interface between the insulators LaAlO₃ and SrTiO₃ as a function of the LaAlO₃ layer thickness. We discovered that the atoms at the interface buckle in an attempt to counteract the internal electric field produced when these two insulators touch one another. <http://www.psi.ch/sls/scientific-highlights>

