Contribution ID: **2** Type: **not specified**

Coherent Correlation Imaging: An new tool for High-Resolution Imaging of Stochastic Dynamics

Monday, 31 May 2021 09:15 (30 minutes)

Coherent scattering of x-rays allows to obtain real space information via (iterative) phasing of the diffraction pattern or via direct phase detection by interference with a reference beam (holography). Regarding „movies "of dynamic processes, reproducibly triggered dynamics is accessible via pump-probe schemes, as they allow to collect sufficient statistics via repetition of the experiment. The observation of stochastic dynamics, including in particular a non-perturbative look at equilibrium dynamics, is more problematic: temporal resolution and spatial resolution are in direct competition (via the signal to noise in the scattering pattern achievable during a given exposure time of the order of the temporal resolution). The situation is identical to the making of a classical movie consisting of an untriggered image sequence: it is difficult to shoot a high speed movie at low light. Here, we present an approach mitigating this dilemma by going away form the blind, continuous averaging of subsequent coherent scattering patterns to a correlation-based classification of scattering patterns, allowing for high spatial resolution without compromising temporal resolution. As a proof-of-principle, the observation of thermal hopping of magnetic domain walls is presented.

About the speaker:
Stefan Eisebitt is a solid state physicist utilizing soft x-ray pulses from synchrotron sources, free electron lasers and high harmonic generation sources. His current research interests are ultrafast magnetization dynamics occurring in structures from the atomic range to the mesoscale, the development of interference based x-ray imaging, spectroscopy and scattering methods and their use to unravel spatio-temporal dynamics on short length and time scales. He is a Director at the Max Born Institute Berlin and Professor at the Technical University Berlin.
https://mbi-berlin.de/p/stefaneisebitt

Presenter: Prof. EISEBITT, Stefan (Max-Born Institute, Berlin, Germany)

Session Classification: Session I