SYSR 8 Hauptvortrag

Zeit: Samstag 12:30–13:00 Raum: TU HE101

Hauptvortrag SYSR 8.1 Sa 12:30 TU HE101

X-ray Holography, Femtosecond Snapshots and the Potential of the BESSY Free Electron Laser — •Stefan Eisebitt — BESSY m.b.H., Albert-Einstein-Str. 15, 12489 Berlin

While holography has evolved to a powerful technique in the visible spectral range, it is difficult to apply at shorter wavelength as no intrinsically coherent (soft) x-ray laser is yet available as a light source. The progression from visible light towards shorter wavelength is motivated by the increase in spatial resolution that can be achieved. Of equal importance is the possibility to exploit special contrast mechanisms provided by scattering in resonance with transitions between electronic core and valence levels. We demonstrate magnetic imaging by x-ray spectro-holography at 50 nm spatial resolution, imaging magnetic domain patterns forming in thin film Co-Pt multilayers. Holography at this wavelength was made possible by combining the sample with a nanostructured mask [1]. This approach is particularly valuable for future *single shot* imaging experiments at free electron x-ray lasers. At such sources, the coherent x-ray flux will be sufficient to record a holographic snapshot using a single x-ray pulse with a duration of a few femtoseconds. Snapshots and pump-probe schemes will thus allow the study of dynamic processes on ultrafast time scales. The future prospects of imaging techniques based on coherent scattering will be discussed in the context of the current development of x-ray lasers, such as the BESSY HGHG free electron laser.

[1] S. Eisebitt, J. Lüning, W. F. Schlotter, M. Lörgen, O. Hellwig, W. Eberhardt, J. Stöhr, Nature, accepted (2004)