

PHYSIKALISCHES KOLLOQUIUM

EINLADUNG

4.11.2011/Wh

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Am Montag, dem 7.11.2011, 16.15 Uhr in W2-1-148

spricht

Prof. Dr. Tim Salditt  
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über

**“X-ray imaging with nanoscale beams”**

Visualization often precedes understanding. Imaging of molecular functions in complex environments such as biological cells or novel composite materials are as important as they are difficult to obtain. Combining high spatial resolution, quantitative contrast, with relevant environmental conditions and the capability to resolve buried structures in three dimensions is a persisting challenge. Owing to the small wavelength and high penetration power, x-rays hold some potential for 3D imaging of unstained and unsliced specimen, which, however, is not yet fully exploited. Circumventing the fabrication constraints of zone plate, novel lensless x-ray imaging techniques approaches have emerged, where the object function is reconstructed from the measured intensities without the need of an object lens.

We present recent results on x-ray imaging of test structures and biological cells [1]. In particular, we show phase reconstructions obtained by using holographic illumination based on the quasi-point source of an x-ray waveguide to illuminate the sample [2]. The experimental and conceptual aspects of x-ray focusing and wave guiding, image formation, object reconstruction, contrast transfer function and resolution of imaging with a quasi point-source imaging will be discussed. Examples of phase contrast projection imaging of membranes and tomographic reconstructions of bacterial cells will be presented [2].

[1] K. Giewekemeyer, et al. “*Quantitative biological imaging by ptychographic x-ray diffraction microscopy*”, PNAS 107 (2), 529 (2010)

[2] K. Giewekemeyer, et al. “*Holographic and diffractive x-ray imaging using waveguides as quasi-point sources*”, New Journal of Physics (2010); S. Kalbfleisch et al., AIP Conf. Series, in press; Giewekemeyer et al, Physical Review A (2011), M. Bartels et al. submitted .

Einladender: Alexander Hartmann