CARL VON OSSIETZKY universität OLDENBURG
Institut für PHYSIK

PHYSICAL COLLOQUIUM

INVITATION

Monday, 13.01.2020, 4.15 p.m., W2-1-148

speaks

Prof. Dr. Gerhard G. Paulus

Institut für Optik und Quantenelektronik,

Friedrich-Schiller-Universität Jena, Germany

about

"Non-invasive cross-sectional imaging with nanoscale resolution: XUV coherence tomography"

Optical coherence tomography (OCT) is an established method for non-invasive crosssectional imaging of biological samples using visible and near infrared light. The axial resolution of OCT only depends on the coherence length _ , with the central wavelength _ and the spectral width _ of the light source. Here, the axial resolution is in the range of a few micrometers. XUV coherence tomography (XCT) extends OCT into the extreme ultraviolet and soft x-ray range. The significant reduction of the coherence length of a broadband XUV source allows nanoscale axial resolution. The usable spectral bandwidth in XCT is mainly limited by absorption edges of the sample under investigation. For example, the so-called silicon transmission window allows cross-sectional imaging of silicon-based circuits. A laboratory-based XCT setup has been implemented by using XUV radiation from a laserdriven high harmonic source. By averaging harmonic combs generated by different fundamental wavelengths, a quasi-supercontinuous spectrum, which is well-suited for XCT, is generated. The radiation is focused onto the sample and the reflected radiation is recorded. Interferences due to reflections at structures in different depths result in modulations in the measured spectra that can be used to resconstruct the axial (i.e. depth) structure of the sample. Experimentally we achieve an axial resolution of 24 nm.

All interested persons are cordially invited.

Sgd. Prof. Dr. Matthias Wollenhaupt