

NANOSCIENCE COLLOQUIUM

X-RAY IMAGING AT THE NANOSCALE WITH ATTOSECOND TIME RESOLUTION

Prof. Dr. Tais Gorkhover

**Institute for Experimental Physics, University of
Hamburg**

Abstract: Most far field imaging methods have to compromise between temporal or spatial resolutions. Electron microscopy is limited in time resolution, optical light scattering within the femtosecond domain lacks spatial resolution. X-ray Free Electron Lasers (FELs) are capable of producing very bright bursts of coherent X-rays with femtosecond pulse durations. X-ray FELs offer unique opportunities to visualize transient processes as “frozen” in time with high temporal and spatial resolutions before the sample is destroyed. I will present an overview over state-of-art nanoparticle imaging experiments with X-ray FELs, new developments such as intense and isolated sub-fs X-ray pulses, and discuss current challenges and opportunities for the study of chemical reactions, ultrafast phase transition and material sciences..

