physikalisches Kolloquium

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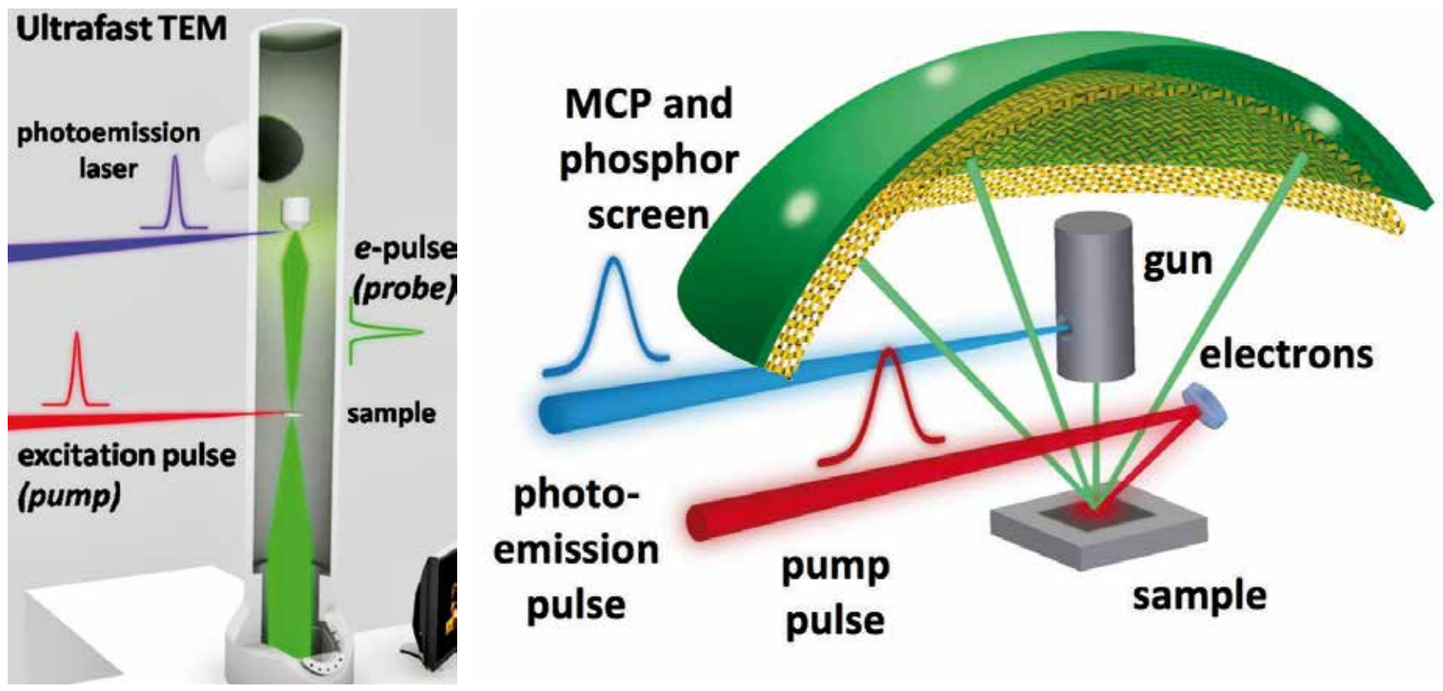
Ultrafast electron microscopy and diffraction using nanoscale photoemitters

Mo. 12.12.16
16:00 Uhr
Ort: H34

Novel methods in time-resolved electron microscopy, diffraction and spectroscopy promise unprecedented insight into the dynamics of structural, electronic and magnetic processes on the nanoscale. A key to the realization of such technologies is the generation of high-quality beams of ultrashort electron pulses. In this talk, our recent development of imaging and spectroscopy using localized electron emitters will be discussed.

Specifically, two approaches employing high-coherence electron pulses from nanotips will be presented, namely Ultrafast Low-Energy Electron Diffraction (ULEED) and Ultrafast Transmission Electron Microscopy (UTEM). ULEED allows for the study of structural dynamics with high temporal resolution and ultimate surface sensitivity, while UTEM combines femtosecond resolution with the imaging and spectroscopy capabilities of an electron microscope.



Two complementary approaches to the study of ultrafast dynamics in solids, at surfaces and nanostructures: Ultrafast Low-energy electron diffraction (ULEED, right) probes structural dynamics at surfaces with electron pulses at kinetic energies of 20-200 eV. Ultrafast transmission electron microscopy (UTEM, left) allows for ultrafast imaging, diffraction and spectroscopy of thin films and nanostructures using high-energy electron pulses (100-200 keV).