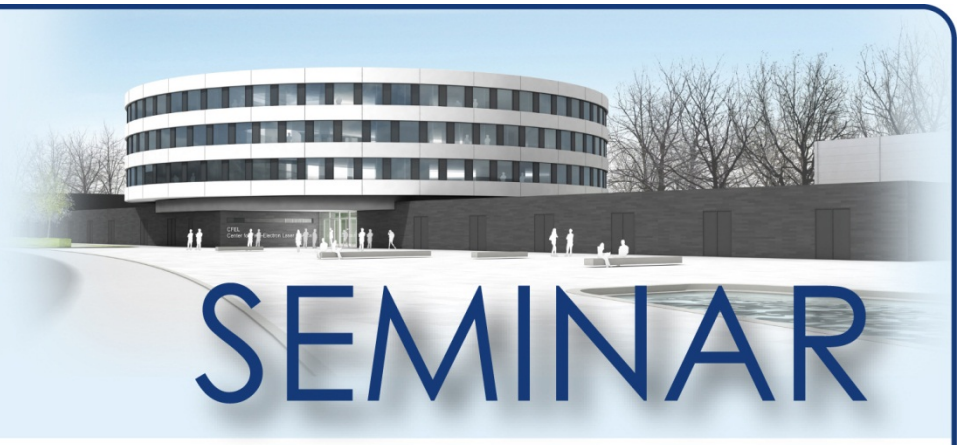
CFEL SCIENCE



SEMINAR

1st December 2010 - 11:00

Building 49, Seminar Room (108)

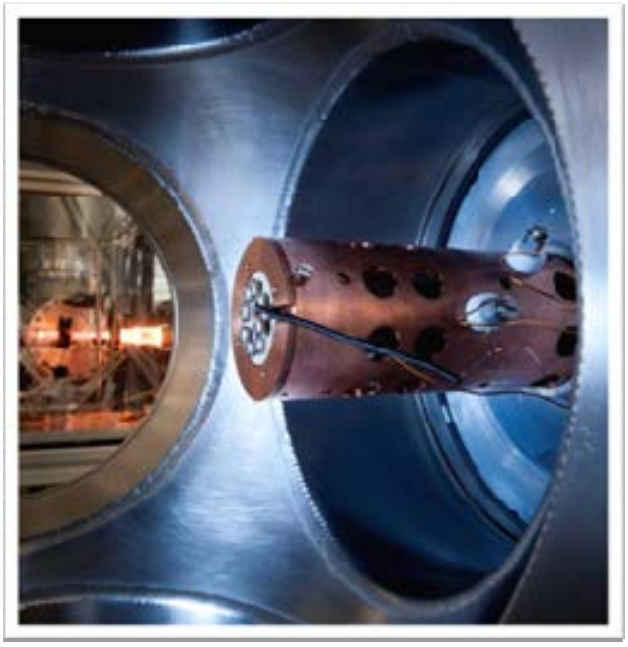
Jan Meinen

Atmospheric Nanoscience Group, Karlsruhe Institute of Technology (KIT)

T R A P S: New laboratory techniques for the investigation of nanoparticles with atmospheric relevance

The relevance of nanoparticles in atmospheric processes is a new topic of atmospheric research. In many condensation processes, the condensation nuclei are in the sub-10 nm diameter range. Properties of particles with size in the transition region from cluster to bulk are size dependent and highly sensitive to surface contamination and contact to other surfaces. No investigation of the fundamental properties of free, mass selected atmospheric nanoparticles with defined charge state and diameters from 3 to 30 nm has been feasible in laboratory experiments so far.

The requirement of experimental methods for the investigation of free nanoparticles without the need for accumulation on substrates or filters will be discussed. Ice clouds forming on nanoparticles of meteoric origin will be given as example for the atmospheric relevance. The TRAPS apparatus will be presented as a device providing a free nanoparticle beam or a trapped nanoparticle cloud to several spectroscopic methods. Experiments like mass spectrometry, optical extinction spectroscopy and photoelectron spectroscopy will be demonstrated as investigation methods, applicable to nanoparticles in this size range. A method for the investigation of ice nucleation on Fe_2O_3 nanoparticles and determination of growth rates under mesospheric conditions and a method for XPS studies on sub-10 nm SiO_2 particles will be presented as recent scientific outcome.



Host: H. Chapman, CFEL Coherent Imaging Division