Karlsruhe Institute of Technology

Institute of Nanotechnology

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Seminar

Full-field X-ray imaging using hard synchrotron radiation: instrumentation, application, recent developments

Sep. 26, 2014, 13:30 until 15:00

Institute of Nanotechnology

Talk given by Dr. Alexander Rack

European Synchrotron Radiation Facility - ESRF, Grenoble

Abstract: Tomography using penetrating radiation allows one to depict the interior of an object in a three-dimensional as well as widely non-destructive manner. Tomography relies on the fact that the mass distribution inside an object can be reconstructed from its radiographic projection images taken from different projection angles. X-ray tomography allows us to reach spatial resolutions down to the sub-micrometer range, i.e. is perfectly suited to study microstructures in materials research. When X-ray tubes are deployed the accessible contrast is commonly defined by the local attenuation behaviour of the specimen.

Synchrotron light sources offer a wider range of contrast modes which are more sensitive, complementary or both. Furthermore, the huge photon flux density available from a synchrotron can reduce the acquisition times down to the (sub)second-range per tomographic scan. X-ray tomography, especially microtomography (microCT) using hard synchrotron radiation, was pioneered in the 1990s. Today microCT is no longer considered exotic or an academic tool whose use is limited to special case studies. Radiography and tomography in a wide range of spatial and temporal resolution, and with a number of contrast modes, have become well-established methods.

The new generation of diffraction-limited synchrotron light sources with the corresponding increase of about two orders of magnitude in source brilliance will allow to reach unprecedented spatio-temporal resolution in hard X-ray imaging. First successful tests of so-called single-bunch imaging with the existing ESRF storage ring will be shown.

This event is part of the eventgroup **INT Talks**

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