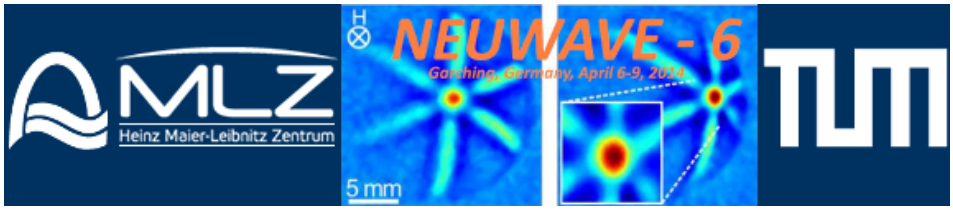

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High Resolution Energy Resolved Neutron Imaging and Resonance Transmission Analysis of engineering samples, geological objects and gamma ray scintillators

Tuesday 8 April 2014 16:30 (30 minutes)

The recent progress in the development of high resolution neutron counting detectors with mcirochannel plate and Timepix readout enables simultaneous detection of a wide range of neutron energies. That allows for simultaneous acquisition of transmission spectra in each pixel of the detector for epithermal, thermal and cold neutrons. The presence of reasonances at energies below 1 keV allow unambiguous elemental and isotope mapping within the samples, while Bragg edge imaging can be used ot study the crystallographic properties of the samples. We present the recent improvements of detector characteristics and demonstrate new results of recent experiments conducted at pulsed and reactor-based sourcesThe 320 μs readout time of our electronics enables measurements of a wide range of energies with small readout deadtime. The results of our recent experiments with single crystal engineering samples, scintillator crystals and geological single crystal samples will be discussed. The possible studies of advanced nuclear fuel elements at pulsed sources are demonstrated by our experiments. The first attempts on the resonance tomography will also be presented, where certain elements can be unambiguously imaged independent of other materials present in the object. The studies of the structure of various welds were performed by the Bragg edge and resonance absorption imaging. The future improvements of the neutron counting MCP/Timepix detection technology will be discussed

Author: Dr TREMSIN, anton (University of California)

Presenter: Dr TREMSIN, anton (University of California)

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