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The Coincident Doppler-Broadening Spectrometer at NEPOMUC

Tuesday, 10 December 2019 15:00 (15 minutes)

The capabilities of the Coincident Doppler-Broadening Spectrometer at the Neutron-induced Positron Source Munich (NEPOMUC) will be presented. In addition an overwiew of planned expansions will be given.
Two beam modes are available: standard operations provide a beam spot of > 300 μm (FWHM) and micro beam for scanning with a reduced diameter of 33 μm (FWHM). Mearsurements may either be conducted as standard Doppler-broadening spectroscopy (DBS) where the signal at each detector is treated separately or in coincident Doppler-broadening mode (CDBS) where the detectors are run as coincidence pairs. CDBS provides a greatly improved signal to noise ratio (10^8) allowing the analysis of the chemical surrundings of defect. Currently four different sample holders are available: i) a piezo x-y stage for precision 2D scanning and hence 3D defect imaging, ii) a heatable sample holder with $T_{max} = 1100$ K for T dependent defect spectroscopy, iii) a cryostat with $T_{min} = 40$ K, iv) a device for in situ tensile tests. Ongoing improvement works include: an automated beam optimization system from which especially the micro beam mode will greatly profit. A planned increase in the number of detectors combined with an upgrade of the readout electronics, which should considerably reduce measurement times.

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