



Contribution ID: 195

Type: **Poster**

NREX - neutron reflectometer with X-ray option

Wednesday, 9 December 2020 17:40 (20 minutes)

The high resolution neutron/ X-ray contrast reflectometer NREX, operated by the Max Planck Institute for Solid State Research, is designed for the determination of structural and magnetic properties of surfaces, interfaces, and thin film systems.

The instrument is an angle-dispersive fixed-wavelength machine with a default wavelength of 4.28 Å. A horizontal focusing monochromator gives the possibility to switch between modes “high intensity/ relaxed resolution” and “high resolution/ reduced intensity” and provides a beam especially for small samples (down to 5×5 mm² and below). A Beryllium filter attenuates higher order reflections. Transmittance supermirrors $m = 3.5$ with a polarizing efficiency of $P > 99\%$ and high efficiency gradient RF field spin flippers are used for a full 4 spin channel polarization analysis.

The sample is aligned horizontally. By tilting the sample the incident angle is varied. The detector arm can move for GISANS horizontally as well as vertically for specular and diffuse scattering measurements. Neutrons are detected with a 20 x 20 cm² position sensitive or a pencil detector. An X-ray reflectometer can be mounted on the sample table orthogonal to the neutron beam. It allows for the in-situ characterization of sensitive soft matter samples and neutron/ X-ray contrast variation experiments.

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Session Classification: Joint poster session of MLZ User Meeting and DN2020

Track Classification: DN: Instrumentation