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NREX –polarized neutron/X-ray reflectometer

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The high resolution/polarization 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/GIND 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. Results of several experiments recently measured at NREX are shown.

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