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REFSANS: The horizontal time-of-flight reflectometer with GISANS option at the Heinz Maier-Leibnitz Zentrum

Tuesday 5 December 2023 14:00 (3 hours)

REFSANS is the horizontal TOF reflectometer with GISANS Option at the MLZ, designed to enable reflectometry and GISANS studies of any interface, as well as to give simultaneous access to a range of Qz values, which is especially useful to study air-liquid interfaces or kinetic phenomena.

Wavelength resolution may be tuned from 0.2 % up to 10%. The optical system allows to independently control the horizontal and vertical beam divergence, in dependence on the sample characteristics. The investigation of kinetic processes is possible thanks to the possibility to embrace a Qz-range with a single instrumental setting. Time resolution can be pushed down to 30 s with data recorded in list-mode: in this way it is possible to perform different time re-binnings for tuning the resolution/intensity trade-off after the experiment.

Taking advantage of the long reactor shutdown, extensive simulations has been performed to find solutions that could increase the performance of the instrument and the flux at the sample position. It has been verified that with a modified design of the instrument geometry and with a new geometry of the radial collimators it would be possible to increase the flux on the sample up to a factor 4.3 for NR as well as 4.5 for GISANS measurements, for sample of typical sizes (50·80 mm2). The new design makes also possible to investigate small interfaces (30·30 mm2) with a gain factor of 3.2 in intensity, opening new options for the experimental analysis of interfaces.

Authors: MANGIAPIA, Gaetano;   Dr MOULIN, Jean-Francois (Hereon);   HAESE, Martin (Helmholtz-Zentrum Hereon);   Prof. MÜLLER, Martin (Helmholtz-Zentrum hereon GmbH);   POMM, Matthias;   ZEC, Nebojša (Helmholtz-Zentrum Geesthacht, GEMS at MLZ);   Dr BUSCH, Sebastian (GEMS at MLZ, Helmholtz-Zentrum Hereon, Germany)

Presenter: MANGIAPIA, Gaetano

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