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The small-angle scattering instrument SANS-1 at MLZ

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We present the features of the instrument SANS-1 at MLZ, a joint TUM and Hereon project [1]. SANS-1 features two velocity selectors and a TISANE chopper, efficiently allowing to tune flux, resolution, duty cycle and frame overlap, including time resolved measurements with repetition rates up to 10 kHz.

A second key feature is the large accessible Q-range facilitated by the sideways movement of the primary 1m^2 detector. Particular attention is hence paid to effects like tube shadowing and anisotropic solid angle corrections that arise due to large scattering angles on an array of single ^3He tubes, where a standard solid angle correction is no longer valid.

SANS-1 features a flexible, spacious sample stage equipped with a heavy-duty 1-ton goniometer, allowing hosting a wide range of different sample environment like a set of sample changers, magnets, ovens, a bespoke dilatometer for in-situ rapid quenching/heating and stress analysis [2] and a dedicated HF-coil system for nanomagnetic hyperthermia [3].

We show scientific highlights and current developments, e.g. a high T furnace that works as an insert for the 2.5T magnet, a future high field magnet and a pressure cell for GISANS. We also present the upgrade plans for a second detector array and a changed guide concept for a massive Q-range extension.

[1] S. Mühlbauer et al., NIMA 832, 297-305, (2016)

[2] TA Instruments, DIL805A/D/T Quenching dilatometer

[3] NB Nanoscale, D5 HF-Generator for Magnetic Hyperthermie

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