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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, a joint project of TUM and HZG [1]. SANS-1 features two velocity selectors with 10% and 6% $\Delta\lambda/\lambda$ and a fast TISANE 14-window double chopper, allowing efficiently tuning flux, resolution, duty cycle and frame overlap, including time resolved measurements with repetition rates up to 10 kHz. The polarization analysis option combines a compensated MEOP and an integrated RF-flipper.

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scattering angles $\sim 40^\circ$ on an array of single ^3He tubes, where a standard \cos^3 solid angle correction is no longer valid. SANS-1 features a flexible, spacious sample stage equipped with a heavy-duty 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 [2] and a dedicated HF-coil system for nanomagnetism/hyperthermia [3].

We show selected highlights and present our current developments, e.g. a high temperature furnace that works as an insert for the 5T magnet and a future high magnetic field project.

[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 Hyperthermia

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