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KWS-1 SANS instrument with polarization analysis

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The KWS-1 small-angle neutron scattering (SANS) instrument is operated by the Jülich Centre for Neutron Science (JCNS) at the research reactor FRM II of the Heinz Maier-Leibnitz Zentrum in Garching near Munich [1].
Among the available options the most important concerns the studies of magnetic samples for which the instrument is equipped with transmission supermirror polarizer, adiabatic radio-frequency spin flipper and a recently obtained dedicated magnet and polarization analyzer. The three-channel V-cavity polarizer with Fe/Si coated supermirrors (m=3.6) has an average polarization > 93% and is positioned in a custom designed changer of revolver type. The flipper provides a high flipping efficiency of more than 99.9% for all neutron wavelengths. A custom designed hexapod allows heavy loads and precise sample positioning in beam (also for grazing incidence SANS under an applied magnetic field). For the experiments with the polarization analysis a ^{3}He analyzer is utilized. Due to space limitations in the sample area a special highly shielded sample magnet was ordered, which allowed close positioning of the 3He cell to the magnet. The magnet has two orthogonal horizontal accesses. For the maximum field of 3 T (parallel to the beam) the decay time, T1, of the 3He cell approximately 50 cm away from the center of the magnet constituted 90 hours. The maximum analyzed q is 0.06 Å–1.
All instrument components are running under a flexible instrument control system (NICOS).

[1] A. Feoktystov, H. Frielinghaus, Z. Di, et al., J. Appl. Cryst., 48, 61 (2015).

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