

Studying Biological Systems over a Wide Length Scale from Angstrom to Micrometer Sizes at the SANS Diffractometer KWS-2

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The small-angle neutron diffractometer KWS-2, operated by the Jülich Centre of Neutron Science (JCNS) at Heinz Maier-Leibnitz Zentrum (MLZ), is dedicated to the investigation of mesoscopic multi-scale structures and structural changes due to rapid kinetic processes in soft condensed matter and biophysical systems. Following demands from the user community, it was recently considerably upgraded,¹ to boost its performance with respect to the intensity on the sample (using lenses and large sample area while maintaining the pinhole resolution), counting rate capabilities (up to 5 MHz for 10% dead time with a new ³He tubes detector supplied by GE Reuter-Stokes), instrumental resolution ($\Delta\lambda/\lambda$ between 2% and 20% using a double-disc chopper with variable slit opening and TOF data acquisition), and the minimum and maximum scattering variable: $Q_{\min} = 0.0002 \text{ \AA}^{-1}$ (using lenses and a secondary high-resolution detector) and $Q_{\max} = 1 \text{ \AA}^{-1}$ (using $\lambda = 3 \text{ \AA}$). All these new options, and the new user-friendly control software, have significantly increased the maneuverability of the instrument. Thus, KWS-2 is a highly versatile tool that can address a broad range of structural studies over a wide length scale, between Angstrom and microns, by offering multiple working modes that can be selected and used in a direct and user-friendly manner.

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