

Studying soft-matter and biological systems over a wide length scale from nm to microns and with high intensity and high resolution at the versatile 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 with the aim of boosting its performance with respect to the intensity on the sample (using lenses and large sample area while maintaining the pinhole resolution), the counting rate capabilities (up to 5 MHz for 10% dead time with a new ³He tubes detector supplied by GE Reuter-Stokes), the instrumental resolution (wavelength resolution between 2% and 20% using a double-disc chopper with variable slit opening and TOF data acquisition), and the minimum and maximum scattering variable; $Q_{\min} = 0.0002 \text{ 1/\AA}$ (using lenses and a secondary high-resolution detector) and $Q_{\max} = 1 \text{ 1/\AA}$ (using $\lambda = 3 \text{ \AA}$), respectively. All these new options, and the new user-friendly control software, have significantly increased the maneuverability of the instrument. Consequently, KWS-2 is a highly versatile tool which can address a broad range of structural studies by offering multiple working modes that can be selected and used in a direct and user-friendly manner.

The concept, the various operation modes and the performance of KWS-2 will be presented in detail. This will be supported by example results obtained in research activities carried out at the instrument on soft-matter and biological systems.

[1] A. Radulescu *et al.*, *J. Vis. Exp.*, 2016, **118**, e54639, doi:10.3791/54639

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