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Upgrade of JCNS SANS instrument KWS-2 for improved performance and beam-time efficiency

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KWS-2 is a classical small angle neutron diffractometer where the pinhole mode with different neutron-wavelengths and detector distances can be combined with focusing mode with MgF_2 lenses to reach a wide Q-range between 2x10^{-4} and 1.0 Å^{-1}. Upgrades of the detection system and sample environment are currently in progress. A wide-angle detection option is currently being tested and optimized and will allow measurements over an extended Q-range up to 2 Å^{-1}, which will be beneficial for semi-crystalline materials and small biological morphologies. The high neutron flux provided by the FRMII reactor and transported by the optimized neutron guidance system required an adjustment of the measurement method for a more rational use of the beam time. A new versatile in-beam sample positioning system, including a multi-position thermostatted carousel, robotic elements and a pool of sample cuvettes, is currently being installed at the instrument's sample position. This enables the instrument to be continuously supplied with samples and the possibility to plan measurements on similar samples or effects in a common long experimental session. Finally, a new size exclusion chromatography setup with in-situ UV-Vis spectroscopy, is currently in construction for providing the instrument with samples of a desired quality, which will improve the performance of KWS-2 for studying aggregation prone proteins and will allow for highly individualized studies of biophysics and soft matter samples. The new upgrades in progress at the instrument will be presented in details.

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