Recent upgrade at high resolution SANS diffractometer D16@ILL.

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D16 is one of ILL's 2-axis cold neutron diffractometer. In terms of Q-space and Q-resolution, D16 nicely fills the gap between the small angle instruments and classical diffractometers.

Because of its special characteristics, D16 remains unequaled for the study of a wide range of systems in biology, physics, and material science.

Its specifications have been optimized for the study of structures with relatively large periodicities of about 5 nm. These include large unit-cell lamellar organizations such as membranes or clays, two-dimensional membrane and surface lattice structures, colloidal and liquid structures, magnetic systems with large fluctuations giving rise to satellite reflections very close to Bragg peaks or small-angle scattering.

The instrument geometry offers a variable vertical focusing which allows working in reflectivity or diffraction mode. The scattering geometry obtained with large, vertically oriented samples, profits the most from the large vertical cross-section of the beam at the sample position. A high-resolution SANS setup is used routinely in experiments requiring the 1% wavelength bandwidth and the high angular resolution of the instrument.

In this presentation, the ENDURANCE II detector project will be presented as well as examples where a major gain would be provided by a large banana detector (protein arrangement at nm scale, nanoporous materials, semi-crystalline polymers, time-resolved and/or small sample experiments, as levitation, samples under mechanical stress).

The new design, the major characteristics, performances and new directions of the instrument will be shown, as well as recent examples of research on D16.

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