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Cryo-TEM –A Complementary Technique for Neutron Scattering

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The neutron instrumentation at the MLZ, in particular Small Angle Neutron Scattering, reflectometry and macromolecular crystallography allow to investigate structures in the range from 1 nm up to several hundred nm in reciprocal space. In soft matter and biology the contrast between hydrogen and deuterium is used to gain deep and quantitative insights about the shape and interactions of the objects forming the investigated structure. Transmission electron microscopy may yield real space pictures of soft matter systems; virtually it may complete and enhance any SANS investigation on soft matter investigation.

A transmission electron microscope (TEM) is available at the Jülich Center for Neutron Sciences at MLZ in the JCNS building.

The instrument is a 200 kV JEM-FS2200 from JEOL with a field emission gun (FEG) and an on-line Omega Energy Filter allowing measurements at magnification from x 50 to x 1 M with a resolution of 0,2 nm in point and 0,1 nm in lattice. The Microscope is equipped with a Tietz CMOS camera with 2048 x 2048 pixels square area. The soft matter thin samples (max~100nm) have to be investigated either in dried or frozen state (Cryo-TEM) to be able to work in the necessary vacuum and to suppress blurring motion of the object as well as radiation damage. The TEM laboratory comprises an extended suite of preparation equipment. Users will be supported by JCNS scientists (M.S. Appavou) to conduct the suitable preparation and TEM investigation.

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