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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 (SANS), reflectometry and macromolecular crystallography allow to investigate structures in the range from one up to several hundred nm in reciprocal space with high statistical accuracy.

In soft matter and biology the neutron 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, particularly in cryogenic environment, in terms of size measurements and distribution of particles, shape, self-assembly systems and aggregates; virtually it may complete and enhance any SANS investigation on soft matter investigation. Both techniques allow to detect structural changes occurring in the relatively large scale structures on the nano-scale.

In order to provide our users the possibility to complete their neutron scattering data, a Cryogenic transmission electron microscope (Cryo-TEM) is available at the Jülich Center for Neutron Sciences at MLZ in the JCNS building.

The instrument as well as the extended suite of preparation equipment will be described and several examples of research investigation in soft matter, particularly nanocomposites, fuel cells, microemulsion, liposomes and polymer self-assembly will be presented.

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