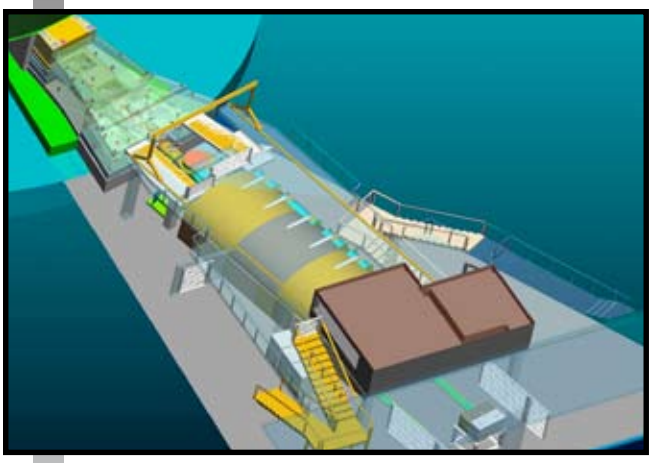
Instrument Fact Sheet

BEAM LINE 6

SPALLATION NEUTRON SOURCE

EQ-SANS — Extended Q-Range Small-Angle Neutron Scattering Diffractometer

The EQ-SANS Diffractometer is designed to study noncrystalline, nanosized materials in solid, liquid, or gas forms such as polymers, proteins in solution, and micelles. EQ-SANS has very high intensity and wavelength resolution. It also has a wide Q coverage, allowing simultaneous data collection in both low-and high-Q regions. Scattering from nanomaterials is concentrated mostly in a forward direction, or small angles. These scattering data yield information about the size and shape of the nanoparticles. Applications include the study of polymers, better detergents and soaps from improved micelles, proteins for better drug design, and materials of interest to the oil industry.



Applications

The unique capabilities of the EQ-SANS offer new opportunities for scientific studies in the following:

Life science

- Solution structures of proteins, DNA, and other biological molecules and molecular complexes
- Protein-protein and protein-ligand interactions, kinase regulation
- Protein-membrane interaction

Polymer and colloidal systems

- Block copolymers and dendrimers
- Micelles, aerosols, and emulsions
- Polyelectrolytes and electric double-layer and ion distribution at solid-liquid interfaces

Materials science

- Simultaneous study of domain and crystalline structures
- Crystallization and precipitation
- Nanoparticles

Earth and environmental sciences

- Pore structure in soil
- Absorption of contaminants by soil
- Fractal structure of rocks

Specifications

Source-to-sample distance	14 m
Bandwidth	3–4.3 Å
Moderator	Coupled supercritical hydrogen
Integrated flux on sample	~10^7–10^9 n/cm^2/s
Q range	0.004 $Å^{-1}$ < Q < 10 $Å^{-1}$

Low-Angle Detector

Sample-to-detector distance	1–8 m
Detector size	1 x 1 m
Detector resolution	8 mm

High-Angle Detector

Sample-to-detector distance	1 m
Angular coverage	~35–150°
Detector resolution	8 mm

Status: In commissioning

For more information, contact

Instrument Scientist: J. K. Zhao, zhaoj@ornl.gov, 865.574.0411
Scientific Associate: Carrie Gao, gaoy1@ornl.gov, 865.576.5296

http://neutrons.ornl.gov/instrument_systems/beamline_06_eqsans

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