GP-SANS

General-Purpose Small-Angle Neutron Scattering Diffractometer

The general-purpose SANS diffractometer is optimized for providing information about structure and interactions in materials in the size range of 0.5–200 nm. It has a cold neutron flux on sample and capabilities comparable to those of the best SANS instruments worldwide, including a wide range of neutron wavelengths λ = 4–20 Å, resolution $\Delta\lambda/\lambda$ = 9–25%, and a 1 x 1 m^2 area detector with 8×4 mm^2 pixel resolution with a maximum counting capability of up to 2 MHz. The sample-to-detector distance can be varied from 1 to 19 m, and the detector can be offset horizontally by up to 40 cm, allowing a total accessible Q range of from <0.001 to 1.3 Å^{-1}. The 2 m sample environment area accommodates large, special-purpose sample environments such as cryomagnets, furnaces, mechanical load frames, and shear cells.

SPECIFICATIONS

Beam spectrum	λ = 4–20 Å $\Delta\lambda/\lambda$ = 9–25%
Sample-detector distance	1–19 m
Detector offset	0–40 cm
Source-sample distance	1.8–17.4 m
Max flux on sample	>2×10^7 n/cm^2/s at λ = 4.75 Å, $\Delta\lambda/\lambda$ = 14%
Detector	2-dimensional linear position-sensitive detector
Detector resolution/pixels	192 x 256
Momentum transfer range	Q = 0.0007 –1.3 Å^{-1} Q_{max}/Q_{min} 10–20

21-G02335_jdh Dec 2021

APPLICATIONS

- Soft condensed matter: molecular self-assembly and interactions in complex fluids; intermediate order in glassy systems, polymer solutions, gels and blends, colloids, micelles, and microemulsions

- Hard condensed matter: phase separation, grain growth, and orientation in metallurgical alloys; structures of nanocomposites, advanced ceramics, and porous catalytic; gas storage in adsorbents including man-made and natural materials

- Magnetic systems: flux lattices in superconductors, ferrofluids, magnetic spin textures, and the relationship between structural and magnetic domains

For more information, contact

Lisa DeBeer-Schmitt, debeerschmlm@ornl.gov, 574.252.6060
Lilin He, hel3@ornl.gov, 864.643.7246

neutrons.ornl.gov/gpsans

OAK RIDGE
National Laboratory

Managed by UT-Battelle LLC
for the US Department of Energy