

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 $\lambda = 4\text{--}20\text{ \AA}$, resolution $\Delta\lambda/\lambda = 9\text{--}25\%$, and a $1 \times 1\text{ m}^2$ area detector with $8 \times 4\text{ mm}^2$ 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 $1.3\text{ \AA}^{-1}$. 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	$\lambda = 4\text{--}20\text{ \AA}$ $\Delta\lambda/\lambda = 9\text{--}25\%$
Sample-detector distance	1–19 m
Detector offset	0–40 cm
Source-sample distance	1.8–17.4 m
Max flux on sample	$>2 \times 10^7$ n/cm ² /s at $\lambda = 4.75\text{ \AA}$, $\Delta\lambda/\lambda = 14\%$
Detector	2-dimensional linear position-sensitive detector
Detector resolution/pixels	192 x 256
Momentum transfer range	$Q = 0.0007$ $\text{--}1.3\text{ \AA}^{-1}$ $Q_{\text{max}}/Q_{\text{min}} = 10\text{--}20$

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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,

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