

Cryogenic Systems for Neutron Studies



*1.5 K CCR for
Neutron Scattering*

Cryogenic systems for neutron scattering have a number of very specific requirements that are unique to this application. Neutron systems typically have a thin-walled neutron zone surrounding the sample area. This neutron zone is most commonly made of aluminum, but may also be vanadium if required. It is an advantage to have these walls as thin as possible, and as far away from the sample as possible, in order to minimize the interaction of the neutrons with the cryostat. Janis cryostats for neutron scattering all feature this type of thin-walled neutron zone, with specific details tailored to fit the needs of the experiment. Since these systems are all built to order, the design can easily be altered to meet local dimensional standards.



*SHI-950T for
Neutron Scattering*

Janis supplies both closed-cycle and liquid helium cooled systems for neutron scattering, including 1.5 K continuously operating closed-cycle systems (shown this page, top left), 4 K closed cycle refrigerator systems (SHI-950T, shown this page, bottom left, and SHI-4T, shown page 2, top left), 10 K closed-cycle refrigerator systems (CCS-250 and CCS-950T), 4 K pulse tube-cooled systems (PT-950T), and helium-cooled variable temperature cryostats (SVT-400T-XG, shown page 2, bottom left).

The sample environment can either be vacuum or static exchange gas. Top-loading static exchange gas systems offer advantages to a user facility because samples can be changed quickly and easily, and because samples with poor thermal conductivity can be cooled effectively.

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Temperature-controlled environment for neutron scattering



SHI-4T

A wide temperature range is often of interest for neutron scattering. Janis has built systems for operation to temperatures as low as 300 mK. Other cryostats are available with a temperature range as broad as 1.5 K to 800 K.

Systems can be designed with detachable tails (including cold tails with indium-sealed joints), allowing tail sets to be exchanged for different experimental configurations. This allows the facility to have one or more base cooling modules with a standard tail interface plus multiple tail sets that have been tailored to specific experiments. The cryostat can then be reconfigured as needed, resulting in greater flexibility for the user facility.



SVT-400T-XG

Some systems are self-supporting on a base plate that can be bolted to a goniometer, allowing the cryostat to be tilted by a few degrees. Other systems have a long tail that reaches down into a neutron well, or into the bore of a magnet.

Whatever the experimental need, Janis applications engineers can work with the sample environment team to provide a customized solution, beginning with an extensive range of proven designs.

For more information, please visit our website at <https://www.lakeshore.com>.

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