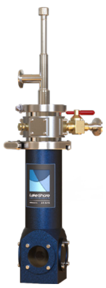
LHe and LN_2 Cryostat Quick View

Lake Shore CRYOTRONICS

environment by JANIS

ST-100 — 2 K to 500 K



General purpose cryostat

ST-400 — 2 K to 500 K

For ultra-high-vacuum (UHV) environments

ST-100-H — 2 K to 800 K

High-temperature ST-100; 800 K optical cryostat

ST-400-H — 2 K to 800 K

High-temperature ST-400; 800 K

ST-FTIR — <2.5 K to 500 K

For use with FTIR spectrometers

ST-500 — 3.5 K to 475 K

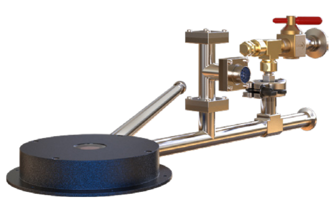
For microscopy; low thermal expansion, ultra-low vibration, and short working distance

ST-300 — 2 K to 420 K

Optimized for use in narrow-gap electromagnets and limited space optical configurations

ST-500-C — 6 K to 475 K

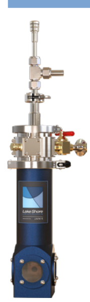
Compact ST-500



ST-300-C — 2 K to 420 K

Ultra compact ST-300; adjustable sample holder position allows varying sample thickness

VPF-100 — 65 K to 500 K



Easy to refill without affecting the controlled temperature; suitable for solid, conductive samples

VPF-FTIR — 65 K to 500 K

For use with FTIR spectrometers

VPF-100-H — 65 K to 800 K

High-temperature VPF-100; 800 K optical cryostat

STVP-NMR — <2 K to 325 K

For NMR magnets; custom configurations available

STVP-100 — <2 K to 325 K

Fast and easy sample change, suitable for a large variety of samples

STVP-100-TH — <2 K to 420 K

Non-optical, high-temperature STVP-100

STVP-FTIR — <2 K to 325 K

For use with FTIR spectrometers

SVT — <2 K to 325 K

LHe reservoir cryostat

VNF-100 — 65 K to 325 K

Fast and easy sample change, suitable for a large variety of samples

VNF-100-TH — 65 K to 500 K

Non-optical, high-temperature VNF-100

- (dark blue) = LHe/LN_2 sample-in-vacuum
- (light blue) = LN_2 sample-in-vacuum
- (dark orange) = LHe/LN_2 sample-in-flowing-vapor
- (light orange) = LN_2 sample-in-flowing-vapor

LHe and LN_2 Cryostat Applications

environment by JANIS

Sample environment / **Typical applications**

Model	Type	Sample type = non-conductive, conductive, solid, liquid, powder	Sample type = conductive, solid	Rotatable sample	Maximum temperature >325 K	LN_2-cooled	LHe-cooled	Fast and easy sample change <10 min	Low vibration 15 nm	UHV	High T_c of superconducting materials	Optoelectronics	Magnetotransport	Microscopy	Raman	Electrical transport	Beamline	NMR	FTIR
STVP-100	Flowing vapor	✓		✓		✓	✓	✓			✓	✓				✓			
STVP-100-TH	Flowing vapor	✓		✓	✓	✓	✓	✓			✓					✓			
STVP-NMR	Flowing vapor	✓				✓	✓	✓								✓		✓	
STVP-FTIR	Flowing vapor	✓		✓		✓	✓	✓								✓			✓
VNF-100	Flowing vapor	✓		✓		✓		✓			✓	✓				✓			
VNF-100-TH	Flowing vapor	✓		✓	✓	✓		✓			✓		✓			✓			
ST-100	Vacuum		✓		✓	✓	✓					✓			✓	✓			
ST-100-H	Vacuum		✓		✓	✓	✓					✓			✓	✓			
ST-300	Vacuum		✓		✓	✓	✓					✓	✓		✓	✓			
ST-300-C	Vacuum		✓		✓	✓	✓					✓	✓	✓	✓	✓			
ST-400	Vacuum		✓		✓	✓	✓			✓							✓		
ST-400-H	Vacuum		✓		✓	✓	✓			✓							✓		
ST-500	Vacuum		✓		✓	✓	✓		✓			✓		✓	✓	✓			
ST-500-C	Vacuum		✓		✓	✓	✓		✓			✓		✓	✓	✓			
ST-FTIR	Vacuum		✓		✓	✓	✓					✓				✓			✓
VPF-100	Vacuum		✓		✓	✓						✓			✓	✓			
VPF-100-H	Vacuum		✓		✓	✓						✓			✓	✓			
VPF-FTIR	Vacuum		✓		✓	✓						✓				✓			✓

Typical applications

The **critical temperature (Tc)** of superconducting materials is the temperature at which a material makes the transition from the normal to superconducting state. A popular characterization method is performing a 4-point resistivity measurement as a function of temperature to find out where the superconducting transition occurs. High Tc materials are ceramics that tend to be poor thermal conductors.

Optoelectronics studies electronic devices that interact with light, such as light-emitting diodes (LEDs), solar cells, and photodetectors. These optical components are cooled to reduce thermal noise and increase sensitivity to observe the components' interaction between light and electrical signals. This is especially important in low-light applications, where even small amounts of noise can affect the accuracy of the measurements.

Magnetotransport studies materials in the presence of a magnetic field. The transport properties of charge carriers, such as their mobility and concentration, can be investigated using techniques such as magnetoresistance and Hall measurements.

Microscopy is using microscopes to observe and study small objects and structures. Cryogenic microscopy techniques are used to study a wide range of materials, including biological samples, polymers, semiconductors, and superconductors.

Raman spectroscopy is used to study the vibrational modes of molecules. A laser excites the sample molecules, causing them to vibrate. The scattered light from the sample is then analyzed to determine the frequencies of the molecular vibrations, which can provide information on the chemical composition and structure of the sample. Raman spectroscopy is often used to study inorganic and organic materials, and it is particularly useful for analyzing materials with complex structures, such as polymers.

Electrical transport is a technique used to study the electrical properties of materials. This can include measurements of electrical resistance, conductivity, and other properties that are important for understanding the behavior of materials in various electronic and magnetic devices.

Cryostats specifically designed to fit within the space restrictions and mechanical constraints imposed by a physics accelerator **beamline** provide vibration-free operation and maximal thermal stability.

Nuclear magnetic resonance (NMR) spectroscopy can determine the sample's atomic-level molecular structure. By analyzing the response of atomic nuclei to a strong magnetic field, NMR spectroscopy can provide information about the chemical environment and interactions of the atoms in the sample. NMR spectroscopy is particularly useful for studying the structure of molecules in solution, and it can also provide information on phase changes, conformational alterations, solubility, and diffusion potential.

Fourier transform infrared (FTIR) spectroscopy is used to study the vibrational modes of molecules. Infrared radiation excites the sample molecules. The absorption of the radiation by the sample is then measured, and the resulting spectrum can be used to identify the molecular bonds and functional groups present in the sample. Cryogenic FTIR spectroscopy is often used to study semiconductor materials.