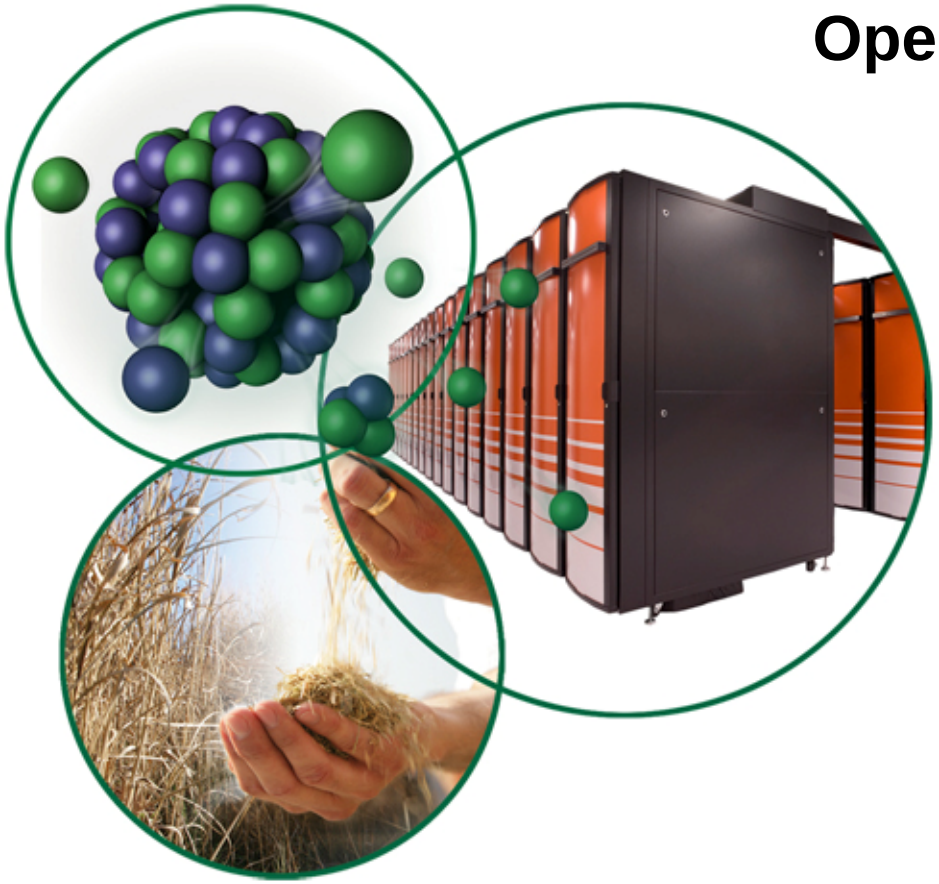
Equipment Fact Sheet



Open Flow Liquid Helium Cryostat

CRYO-02

Neutron Scattering Science Division

Sample Environment Group

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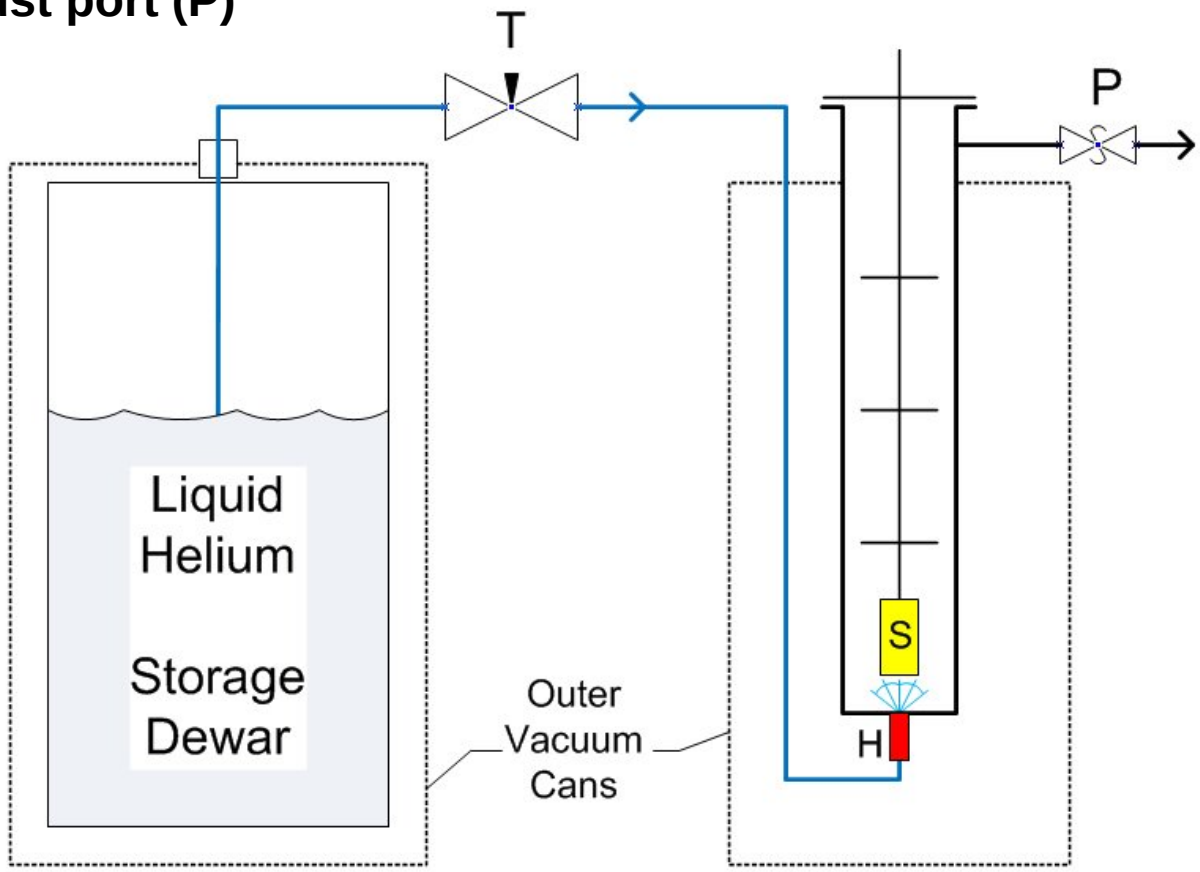
Open Flow Cryostat Schematic

- **Liquid helium flows from storage dewar into cryostat via special transfer line (T)**
- **Helium flows through heat exchanger (H) nozzle equipped with sensor and heater for temperature control**
- **Temperature-regulated helium stream flows past sample (S), up sample tube, and out exhaust port (P)**



CRYO-02 General Description

- **“SuperTran” Open flow liquid helium cryostat manufactured by JANIS Research (model STVP-200 with SNS customization)**

Standard off-the-shelf version

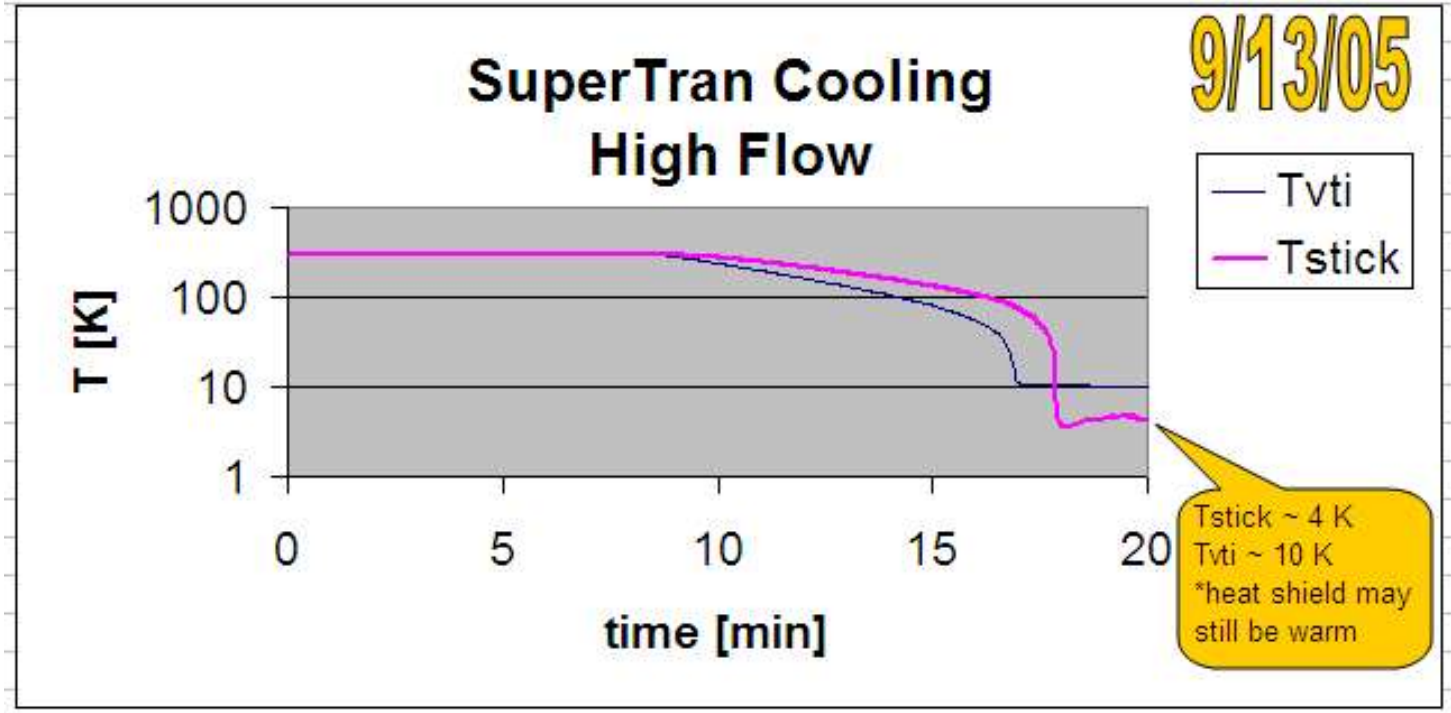
CRYO-02 was the first sample environment device operated in the neutron beam at the SNS

CRYO-02 General Description

- **Open flow liquid helium system**
  - **Liquid helium (LHe) stored in external dewar**
  - **Special, slow-flow transfer line connects dewar and SuperTran unit**
    - **Flow rate can be regulated by liquid valve built into transfer line**
  - **Liquid injected into vaporizer at bottom of SuperTran sample tube**
  - **Helium exhaust gas exits from top of sample tube**
    - **Can pump or allow to passively flow to atmosphere**
  - **Top loading sample access (50 mm sample tube)**

Test Data – Cooling with Flow to Atmosphere

- **Cooling rate varies with helium flow rate**
  - **Flow rate estimated by observing exhaust port**
    - **Frosty cold or warm-n-dry port**
    - **Cool down times faster than 20 minutes!**
  - **Cooling does not begin immediately due to transfer line cooling**



Test Data – Pumped Cooling

- **Cooling rate varies with helium flow rate**
  - **Flow conditions for 60 minute cool down**
    - **Actively pumping VTI (~0.2 Bar exhaust, no warm valve)**
    - **No direct flow rate measurement here, but we need to implement for future tests**
- **Sample stick has considerable mass**