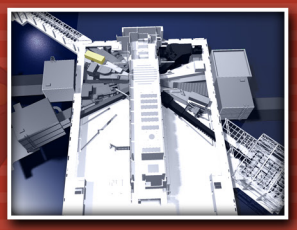
# Instrument Fact Sheet

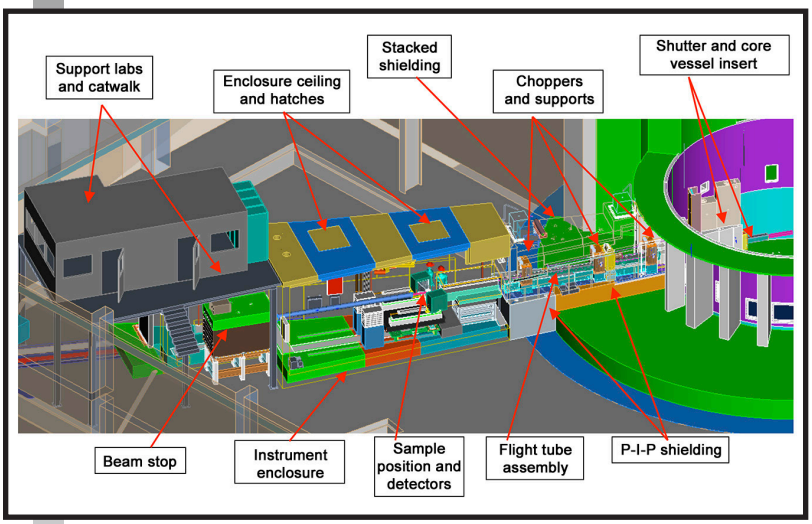
BEAM LINE 3

Spallation Neutron Source



## SNAP – Spallation Neutrons and Pressure Diffractometer

The Spallation Neutrons and Pressure (SNAP) diffractometer, a high-flux, medium-resolution instrument, uses highly integrated advanced area detectors, beam-focusing optics, and a suite of pressure devices to study a variety of powdered, single-crystal, and amorphous materials under extreme pressure and temperature. Traditional Paris-Edinburgh presses are used to reach 25 GPa. The instrument staff and the instrument development team are making progress with "large-volume" diamond anvil cells in hopes of significantly extending the pressure range currently accessible to neutron diffraction. The goal is to routinely achieve pressures of 50 to 100 GPa for samples on the order of 0.05 $mm^3$. Though such high pressures are not yet available to general users, commissioning-type experimental collaborations are welcome.




## Applications

- Hydrogen under extreme conditions
- Planetary ices—structure and strength of ices under pressure
- Silicate melts—glasses at high pressure and temperature and the dynamical changes occurring during heating and pressurization
- Hydrogen bonding in organic and inorganic systems as a function of pressure and temperature, including liquids
- Structural studies in functional oxides such as thermoelectrics and ferroelectrics
- Magneto-structural correlations in lanthanides and transition metal compounds
- Structural signatures of pressure-induced phenomena in non-conventional superconductivity
- Pressure effects on permanent magnets

## Specifications

| | |
|---|---|
| Moderator | Decoupled poisoned supercritical hydrogen |
| Source-to-sample distance | 15 m |
| Sample-to-detector distance | 50 cm |
| Angular coverage | $26^o < 2\Theta < 138^o$, ±22.5° vertical |

| | |
|---|---|
| Pressure range | <25 GPa |
| Temperature range | 100-1500 K (w/ reduced pressure range) |
| Focused beam size | From 1 cm to 400 $\mu$m |

| Wavelength range (bandwidth) |
|---|
| At $2\Theta = 90^o$ (crystalline powder) $0.5 \le d \le 8.0$ Å |
| At $2\Theta = 35^o$ (glasses & liquids) $0.7 \le Q \le 30$ $Å^{-1}$ |

Status: Available to users


**For more information, contact**

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