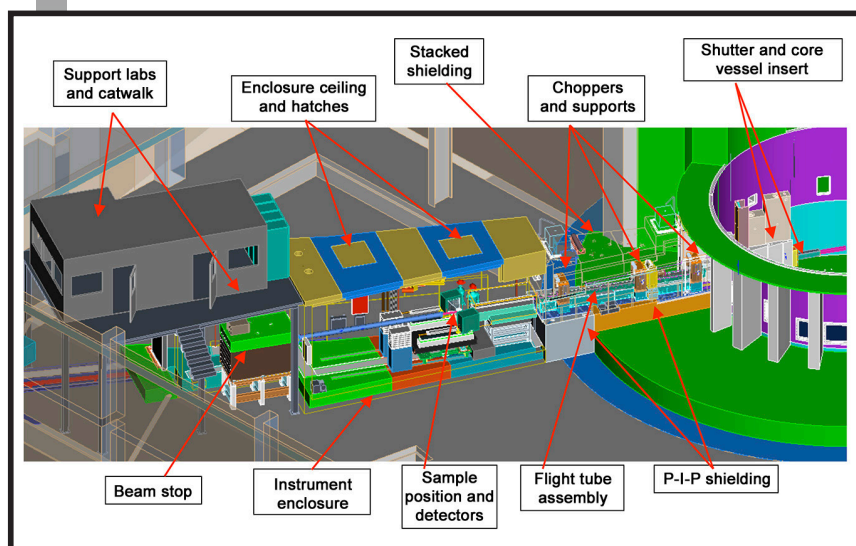


## SNAP – SPALLATION NEUTRONS AND PRESSURE DIFFRACTOMETER

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 dif-

fraction. The goal is to routinely achieve pressures up to 40 GPa for samples on the order of 0.05 mm<sup>3</sup>. Higher 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 nonconventional superconductivity
- Pressure effects on permanent magnets

### FOR MORE INFORMATION, CONTACT

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[neutrons.ornl.gov/snap](http://neutrons.ornl.gov/snap)

### SPECIFICATIONS

Moderator	Decoupled poisoned supercritical hydrogen
Source-to-sample distance	15 m
Sample-to-detector distance	50 cm
Angular coverage	$26^\circ < 2\theta < 138^\circ$ , $\pm 22.5^\circ$ vertical
Pressure range	Up to 40 GPa using various pressure devices
Temperature range	10 K to 1500 K w/ reduced pressure range)
Focused beam size	From 1 cm to 400 $\mu\text{m}$

Wavelength range (bandwidth)	
At $2\theta = 90^\circ$ (crystalline powder)	$0.5 \leq d \leq 8.0 \text{ \AA}$
At $2\theta = 35^\circ$ (glasses & liquids)	$0.7 \leq Q \leq 20 \text{ \AA}^{-1}$

Status: Available to users