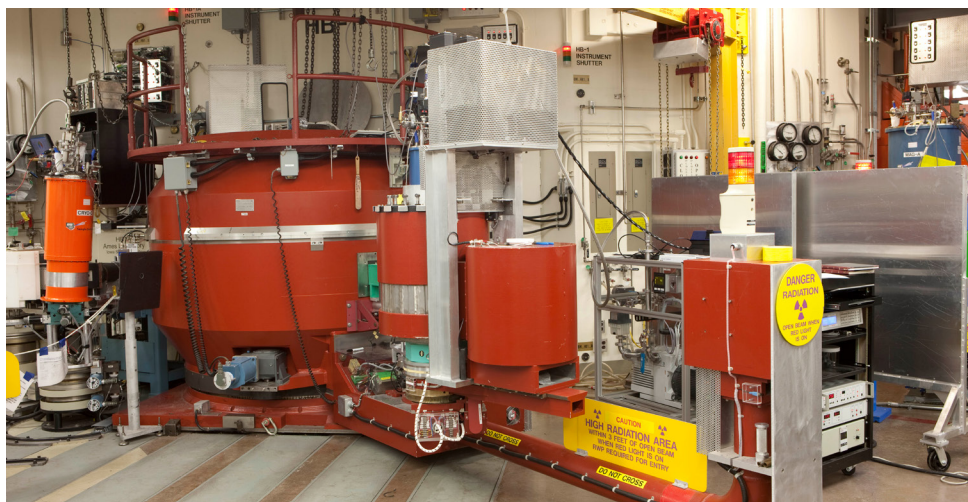


## PTAX

## Polarized Triple-Axis Spectrometer

The HB-1 Polarized Triple-Axis Spectrometer employs Heusler monochromator and analyzer crystals. It is designed primarily for full- and half-polarized measurements of detailed magnetic structures, including spin chirality and spin density distributions, as well as magnetic excitations. The polarized setup is sufficiently compact to accommodate the full range of available sample environments, including high-temperature furnaces ( $\leq 1500^{\circ}\text{C}$ ), ultra-low temperature cryostats ( $\geq 0.03\text{K}$ ), vertical field cryomagnets ( $\leq 8\text{T}$ ), pressure cells ( $\leq 2\text{GPa}$ ), electric field sticks ( $\leq 10\text{kV}$ ), and uniaxial pressure stick (force up to 300 lbs).

Using the Wollaston Prisms setup, ultra-high energy and Q resolution measurements have become possible (<https://fankangli.ornl.gov/>). The spherical neutron polarimetry (SNP) enables the measurement of full polarization change in the scattering process, providing a unique way to study complex magnetic structures (Contact: [jiangc@ornl.gov](mailto:jiangc@ornl.gov)).



## APPLICATIONS

- Spin and lattice excitations in hard condensed matters, including superconductors, quantum materials, frustrated materials, and topological materials
- Spin density distributions in magnetic compounds
- Detailed spin structure, including chirality
- Larmor Diffraction with ultra-high Q resolution ( $\Delta d/d \sim 10^{-6}$  for thermal expansion and  $\Delta d/d \sim 3 \times 10^{-4}$  for the measurements of split of Bragg peak)
- Inelastic Neutron Spin Echo with ultra-high energy resolution ( $\sim 10 \mu\text{eV}$ ) for linewidth measurements

## SPECIFICATIONS

Beam spectrum	Thermal
Monochromators	Polarized Vertical Focus Heusler(111)
Analyzers	Unpolarized vertical focus PG(002) Polarized Horizontal focus Heusler (111)
Monochromator angle	$2\Theta_M = 14$ to $45^{\circ}$
Sample angle	$\pm 180^{\circ}$
Scattering angle	$-90$ to $120^{\circ}$
Analyzer angle	$-40$ to $140^{\circ}$
Collimations (FWHM)	Premonochromator: $48'$ Monochromator-sample: $20', 40', 60', 80'$ Sample-analyzer: $60'$ Analyzer-detector: $20', 70', 90', 120', 210', 240'$
Detector	Single $^3\text{He}$ gas counter
Resolution (elastic)	$5-10\%$ Ei (adjustable with collimators)

26-G023702/cpp April 2026

## For more information, contact

Masaaki Matsuda, [matsudam@ornl.gov](mailto:matsudam@ornl.gov), 865.574.6580Avishek Maity, [maitya@ornl.gov](mailto:maitya@ornl.gov), 865.341.3746[neutrons.ornl.gov/ptax](https://neutrons.ornl.gov/ptax)Managed by UT-Battelle LLC  
for the US Department of Energy