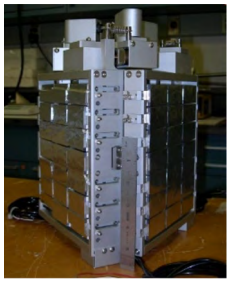
TAX
Triple-Axis Spectrometer

High Flux Isotope Reactor

BEAMLINE
HB-3

HB-3 is a high-flux thermal neutron three-axis spectrometer designed for inelastic measurements on single crystals over a wide range of energy and momentum transfers. The energy and momentum range for measurements is quite large at HB-3. Because of its location directly at the end of the beam tube and the availability of a beryllium monochromator, the instrument is the ideal location for performing experiments at high-energy transfers (up to about 150 meV). The HB-3 monochromator provides three crystal choices (PG 002, Be 002, and Si 111) with variable vertical focus. This focus is calibrated to maintain a 2.54 cm beam height at the sample position, thus optimizing incident neutron flux as the incident energy varies. Of the three monochromators, pyrolitic graphite provides the highest neutron intensity as a result of its very high neutron reflectivity. The high-quality beryllium monochromator allows measurements with good energy resolution at higher energy transfers, whereas the silicon monochromator has the advantage of an absent second-order reflection, providing a higher order contamination-free beam.



SPECIFICATIONS

Beam spectrum	Thermal
Monochromators	Variable vertical focusing PG (002), Be (002), Si (111)
Analyzer	Fixed vertically focused PG (002)
Monochromator takeoff angle	$2\Theta_M$ = 12 to 75°
Sample angle	±180°
Scattering angle	-90 to 128°
Analyzer angle	-40 to 90°
Detector	Single ^{3}He gas counter
Resolution (elastic)	5-10% Ei (adjustable with collimators)
Collimations (FWHM)	Premonochromator: 30', 48' Monochromator–sample: 20', 40', 60', 80' Sample–analyzer: 20', 40', 60', 80' Analyzer–detector: 30', 70', 90', 120', 210', 240'

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APPLICATIONS

- Spin and lattice dynamics in high-temperature superconductors
- Magnetic excitations in low-dimensional magnetic model systems
- Spin waves in magnetically ordered systems
- Phonon anharmocities and linewidths in thermoelectric materials and alloys
- Magnetic critical scattering in phase transitions
- Crystalline electric fields

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