

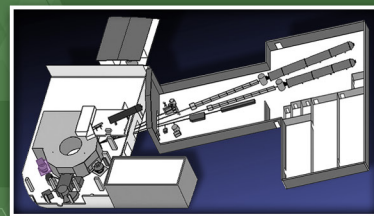
HIGH FLUX ISOTOPE REACTOR

INSTRUMENT

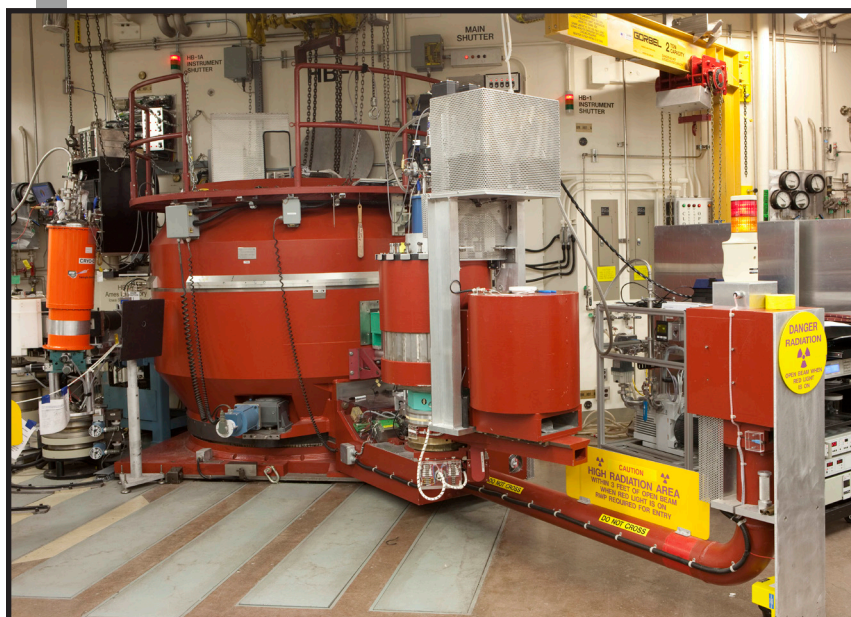
BEAM LINE

HB-1

POLARIZED TRIPLE-AXIS SPECTROMETER



The HB-1 Polarized Triple-Axis Spectrometer is designed primarily for the study of excitations in crystalline solids at intermediate energies. Thanks to the vertical beam focusing and the very high time-averaged flux at HFIR, its geometry is optimal for investigating small samples and weak scattering in specific areas of energy-momentum space.



The sample goniometers and a full software implementation of the three-dimensional sample orientation matrix allow measurements outside the traditional single-scattering plane. The unique capability of HB-1 is the polarized configuration for studies of excitations, phase transitions, structures, and density distributions in magnetic materials.

SPECIFICATIONS

Beam spectrum	Thermal
Monochromators	Unpolarized vertical focus PG(002) Polarized Vertical Focus Heusler(111)
Analyzers	Unpolarized fixed vertical focus PG(002), Be(101), Si(111) Polarized Heusler (111)
Monochromator angle	$2\Theta_M = 14$ to 75°
Sample angle	$\pm 180^\circ$
Scattering angle	-90 to 120°
Analyzer angle	-40 to 140°
Collimations (FWHM)	Premonochromator: 15', 30', 48' Monochromator-sample: 20', 40', 60', 80' Sample-analyzer: 20', 40', 60', 80' Analyzer-detector: 20', 70', 90', 120', 210', 240'
Detector	Single ^3He gas counter
Resolution (elastic)	5–10% Ei (adjustable with collimators)

Status: Available to users

APPLICATIONS

- Spin waves in ordered magnetic materials
- Exotic excitations in low-dimensional, molecular, itinerate, and other “quantum” magnets
- Spin and lattice excitations in high- T_c superconductivity, colossal magnetoresistance materials, and multiferroic systems
- Spin density distributions in magnetic compounds
- Detailed spin structure, including chirality
- Phonon dispersion curves in alloys and phonon-driven phase transitions

FOR MORE INFORMATION, CONTACT

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