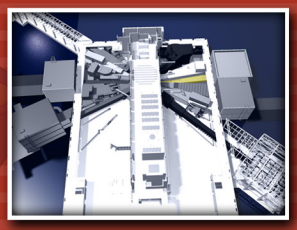
Instrument Fact Sheet

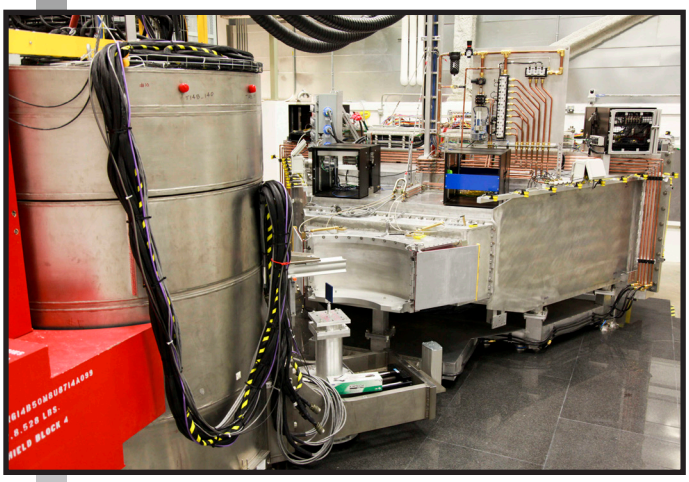
BEAM LINE 14B

Spallation Neutron Source



HYSPEC – Hybrid Spectrometer

HYSPEC is a high-intensity, direct-geometry instrument optimized for measurement of excitations in small single-crystal specimens. The incident neutron beam is monochromated using a Fermi chopper with short, straight blades and is then focused onto the sample using Bragg scattering optics. Neutrons are detected in a bank of position-sensitive detector tubes that can be positioned over a wide range of scattering angles about the sample axis. This combination of Fermi chopper and Bragg focusing optics, plus a position-sensitive detector bank, leads to a highly flexible instrument in which the energy and wave vector resolution can be independently varied by nearly an order of magnitude. Either full or partial neutron polarization analysis can be deployed on HYSPEC. This is accomplished by using a Heusler crystal array to polarize the incident beam and either a ^{3}He spin filter or supermirror wide-angle polarization analyzers for the scattered beam.



Applications

- Unconventional superconductors
- Exotic ground states in quantum magnets
- Quantum critical phenomena
- Lattice and magnetic dynamics in functional materials: ferroelectrics, memory shape alloys, magnetoresistive and magnetocaloric materials)
- Excitations in geometrically frustrated magnets
- Phase transitions
- Complex phases in intermetallic compounds
- Frustrated magnets
- Itinerant magnets
- Spin and lattice dynamics in nanostructures

Specifications

Moderator	Coupled cryogenic hydrogen
Moderator-to-Fermi chopper distance	37.2 m
Chopper-to-sample distance	3.2 m
Focusing crystals-to-sample distance	1.4–1.8 m
Sample-to-detector distance	4.5 m
Incident energy range	3.6–60 meV
Energy resolution (elastic scattering)	$0.02 < (\Delta E/E_i) < 0.2$
Scattering-angle range	$2° < 2\theta_S < 135°$

Status: Available to users for unpolarized measurements. In commissioning for polarization analysis.

For more information, contact

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