# HYSPEC

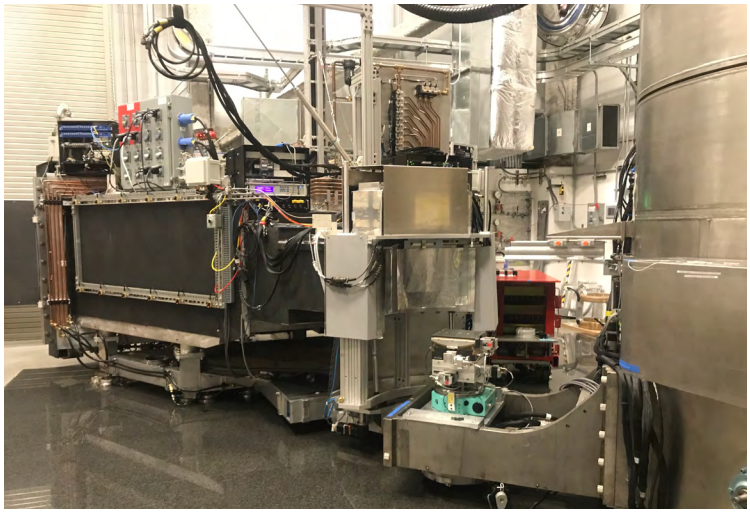
## Hybrid Spectrometer

Spallation Neutron Source

BEAMLINE

14B

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. Both linear polarization analysis and a half-polarized mode are available on HYSPEC. This is accomplished by using a Heusler crystal array to polarize the incident beam and a supermirror wide-angle polarization analyzer for the scattered beam.



## APPLICATIONS

- Exotic excitations in quantum magnets and quantum critical phenomena
- Complex ground states in geometrically frustrated magnets
- Unconventional superconductors
- Intertwined lattice and magnetic dynamics in functional materials: ferroelectrics, memory shape alloys, thermoelectrics and magnetocaloric materials
- Itinerant magnetism
- Coherent and incoherent dynamics in hydrogen-containing materials

## SPECIFICATIONS

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|---|---|
| Moderator | Coupled cryogenic hydrogen |
| Modertor-to-Fermi chopper distance | 37.17 m |
| Chopper-to-sample distance | 3.61 m |
| Focusing crystals- to-sample distance | 1.8 m |
| Sample-to-detector distance | 4.5 m |
| Incident energy range | 3.8–60 meV |
| Energy resolution (elastic scattering) | $0.02 < (\Delta E/E_i) < 0.2$ |
| Horizontal scattering-angle range* | $60°$ within $-118° < 2\theta_H < 118°$ |
| Vertical scattering-angle range | $-7.5° < 2\theta_V < 7.5°$ |

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*Available horizontal scatter range is a function of Incident Energy, and minimum reasonable scatter angle varies by sample size and >2°


**For more information, contact**

Barry Winn, winnbl@ornl.gov, 865.576.0033
Ovidiu Garlea, garleao@ornl.gov, 865.574.2969
Melissa Graves-Brook, gravesbrookm@ornl.gov, 865.313.5418

neutrons.ornl.gov/hyspec



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