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Polarized neutron triple-axis spectrometer (PTAX) for hard-condensed matter research

Neutron polarization analysis is a powerful technique for condensed matter research. It can separate magnetic and nuclear components, determine the detailed spin direction, and observe weak ferromagnetic component and spin chirality. PTAX/HB-1, installed at the High Flux Isotope Reactor (HFIR) at the Oak Ridge National Laboratory, has a variety of polarized equipment, such as Helmholtz coils and cryomagnets, for both elastic and inelastic scattering studies. These studies can be performed in a wide range of temperature (0.05 - 650 K), high pressure (≤ 1.8 GPa), magnetic field (≤ 8 T), and electric field (≤ 10 kV). We have also implemented unique capabilities: the Wollaston Prisms for Larmor diffraction (ultrahigh Q resolution) and inelastic spin-echo (ultrahigh energy resolution) measurements and the Spherical Neutron Polarimetry (SNP) device for studying complex magnetic structures. We will present the instrument capabilities, upgrade plans, and scientific output from the instrument.

Topical Area

Hard matter: quantum, electronic, semiconducting materials

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