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Development of the Multi-Analyzer Neutron Triple Axis (MANTA) Spectrometer at ORNL

The Multi-Analyzer Neutron Triple Axis (MANTA) Spectrometer is a cold neutron instrument currently in development as part of the planned upgrade to the cold guide hall at the High Flux Isotope Reactor (HFIR). MANTA will replace the current CTAX instrument at HFIR and will boast a factor of 50x improvement in the neutron flux, thereby establishing it as a world-class cold-neutron spectroscopy instrument. This will be achieved by positioning the instrument at the ideal location in a re-optimized cold guide hall and by using modern guides with the geometry and m-coatings established by rigorous McStas simulations. The upgraded incident beamline will also include a neutron velocity selector, virtual source, double-focusing pyrolytic graphite monochromator, modern sample table, and a V-cavity to facilitate incident beam polarization. The design is optimized to provide the maximum flux on a 2cm x 2cm sample with an incident energy between 2.6 and 20 meV. To provide overlap with the thermal instruments, it will operate at higher energies. Phase I of the project will deliver an updated single analyzer-detector backend capable of polarization analysis and a dedicated ≥ 14 T vertical field cryomagnet. Phase II of the project will introduce an interchangeable multiplexed secondary spectrometer based on the IRIS or CAMEA concept. This talk will describe the current status of the MANTA project with a focus on the ongoing pre-conceptual design work for Phase I and some discussion of our plans for Phase II.

Topical Area

Hard matter: quantum, electronic, semiconducting materials

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