Advancing Materials Characterization using Neutron Diffraction at ORNL’s Spallation Neutron Source (SNS, the High Flux Isotope Reactor (HFIR) and the future Second Target Station (STS))

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Oak Ridge National Laboratory’s Neutron Sciences Directorate operates two neutron scattering Scientific User Facilities, the High Flux Isotope Reactor (HFIR) and the Spallation Neutron Source (SNS), for the US Department of Energy, Office of Science. We are committed to enabling high impact research in a broad array of scientific fields, by delivering a powerful array of world class neutron instrumentation and associated technologies for our users worldwide. This is aligned with our vision where important “human” problems are answered by advances in materials science, in which the unique strengths of neutron scattering play an essential role. In this talk I will give several examples of work done using our suite of neutron diffractometers that work in concert to deliver new capabilities to study quantum material, chemistry, energy materials and materials science and engineering- materials research that will push forward the forefront of energy relevant technologies of the future. Further demonstrating how neutron scattering is a versatile technique that increasingly serves the materials science community to solve problems ranging from the new superconductors to porous metal-organic-frameworks for hydrogen storage or carbon capture as well as new battery materials with earth abundant compositions. I will also talk about the 3-source strategy as we prepare for the Proton Proper Upgrade (PPU) at SNS and ensuing plans for the Second Target Station.

Figure 1. Future of Neutron Scattering at Oak Ridge National Laboratory: Three World Leading Neutron Scattering Facilities for Breakthrough Materials Science