

Combining characterization techniques at the NSLS-II

Eric Dooryhee¹

¹*Brookhaven National Laboratory, Upton, United States*

E-mail: dooryhee@bnl.gov

The National Synchrotron Light Source II (NSLS-II) is a US Department of Energy Office of Science Basic Energy Science new scientific user facility, located at Brookhaven National Laboratory (BNL), New York. NSLS-II's mission is to address critical scientific grand challenges in energy security, advanced materials synthesis and manufacturing, environment, and human health. NSLS-II started operations in October 2014 with a handful of beamlines and since then, has been rapidly ramping up its science and user programs, as well as continuing the development of new beamlines and associated scientific capabilities. The NSLS-II will provide a wide range of in situ and operando spectroscopy-microscopy and tomographic techniques combined with structural characterization techniques, in the soft, tender and the hard X-ray energy range.

An increasing number of science cases require to combine techniques, in particular spectroscopic, scattering and imaging techniques that help examine the structure-function relationships that occur at different scales (\AA -m; sec-months; >1 attoL) in complex systems or in hierarchical, heterogeneous systems, either in bulk or in thin films or in spatially-resolved gauge volumes. Structural information may be addressed by diffraction for long-range atomic structure, by Pair Distribution Function & Extended X-ray Absorption Fine Structure Spectroscopy for short-to-mid range, and by Small-angle X-ray Scattering for larger scale structure.

This talk will outline such scientific opportunities at the NSLS-II, with emphasis on the program at the X-ray Powder Diffraction (XPD) beamline, enabling such new tools as in situ PDF, combined DRIFTS+XRD and Modulation Enhanced Diffraction (MED).

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