

Abstract Submitted  
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**The Short-Pulse X-ray Facility at the Advanced Photon Source<sup>1</sup>**

LINDA YOUNG, Argonne National Laboratory, PAUL EVANS, University of Wisconsin-Madison — The Short-Pulse X-ray (SPX) Facility will extend time-resolved x-ray scattering and spectroscopy to the picosecond time scale while retaining the powerful characteristics of synchrotron radiation, i.e., user-controlled continuous tunability of energy, polarization, and bandwidth combined with exquisite x-ray energy and pulse-length stability over a wide energy range. Experiments at the SPX facility will produce 1-ps stroboscopic snapshots of molecular rotations, molecular excited-state transient structures, stress/strain wave propagation, magnetic domain wall dynamics, phase transitions, and the coupling between electronic, vibrational, and magnetic degrees of freedom in condensed matter systems. Time-resolved studies of transient dynamics will be possible with simultaneous picosecond time resolution and picometer structural precision for a variety of atomic, molecular, supramolecular, nanoscale, and bulk material systems. Pump-probe experiments using high-average-power, sub-picosecond, high-repetition-rate laser systems will make efficient use of the MHz x-ray rates of the SPX. Five end stations for x-ray scattering, diffraction, spectroscopy, imaging, and microscopy can be developed as part of the Advanced Photon Source Upgrade project.

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