

THE ADVANCED PHOTON SOURCE

THE INTERMEDIATE ENERGY X-RAY BEAMLINE

AT THE APS

The Intermediate Energy X-ray Collaborative Development Team (IEX-CDT) is constructing a new insertion device beamline at Sector 29 of the U.S. Department of Energy (DOE) Office of Science's Advanced Photon Source (APS).

This facility will address one of the core challenges in condensed matter physics: understanding the fundamental mechanisms driving collective electronic behavior in materials. The IEX-CDT is a close collaboration between the APS at Argonne National Laboratory and principal investigators from the University of Illinois at Chicago (J. C. Campuzano) and the University of Illinois at Urbana-Champaign (P. Abbamonte), and represents a strong commitment from both the DOE and the U.S. National Science Foundation to build the first beamline of its kind in North America.

The beamline will utilize intermediate-energy x-rays (250 eV to 2500 eV) with high-energy resolution, high flux, and small spot size to support investigations of correlated electron physics with two complementary techniques: angle-resolved photoemission spectroscopy and resonant soft x-ray scattering.

This premier facility begins with a state-of-the-art insertion device, the electromagnetic variable polarizing undulator (EM-VPU), which was developed by the Argonne Accelerator Systems Division. The EM-VPU will allow users to optimize beam properties by the selection of polarization (horizontal, vertical, or circular) and higher-order harmonic suppression via the ability to run in quasiperiodic mode. The optical system is based on an in-focus variable line-spacing plane grating monochroma-



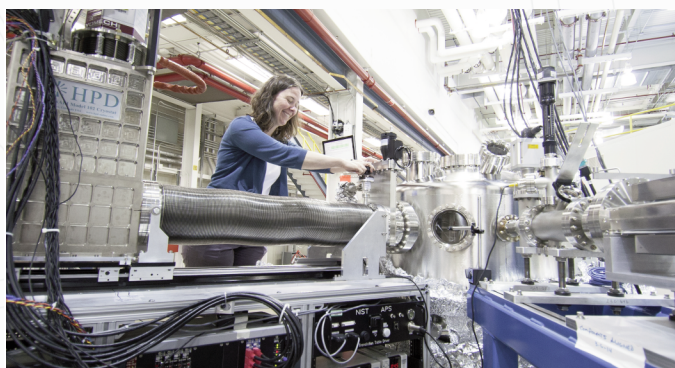
The IEX commissioning team at the 29-ID beamline. First row left to right: Jessica McChesney (Argonne), Yizhi Fang (University of Illinois, Urbana-Champaign), Mohan Ramanathan (Argonne), Fanny Rodolakis Simoes (University of Chicago). Second row left to right: Tim Roberts (Argonne), Mike Fisher (Argonne), Ruben Reininger (Argonne).

tor equipped with three gratings. At 1000 eV the high-flux grating will deliver 10^{12} photons/sec with a resolving power of 2500, and the high-resolution grating will deliver 50,000 resolving power and 10^{10} photons/sec. The beam is then focused by a pair of Kirkpatrick-Baez mirrors into one of two dedicated end stations: an angle-resolved photoemission spectroscopy chamber with a 6-axis, low-temperature (<10 K) goniometer, or a resonant soft x-ray scattering chamber featuring a kappa diffractometer and area detector.

Commissioning of the beamline is under way and the user program is expected to start in June 2015, when the IEX beamline will become part of the Magnetic Materials Group in the Argonne X-ray Science Division.

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Jessica McChesney readies the 29-ID transition edge sensor detector, which is part of a collaboration with the Quantum Devices Group at NIST.

CALL FOR APS GENERAL-USER PROPOSALS




The Advanced Photon Source is open to experimenters who can benefit from the facility's high-brightness hard x-ray beams.

General-user proposals for beam time during Run 2015-2 are due by Friday, March 6, 2015.

Information on access to beam time at the APS is at http://www.aps.anl.gov/Users/apply_for_beamtime.html or contact Dr. Dennis Mills, DMM@aps.anl.gov, 630/252-5680.

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