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Authors

Warwick, Tony
Howells, Malcolm R.
Jacobsen, Chris J.
[et al.](#)

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Beamlines for Coherent X-ray Diffractive Imaging and Scattering at the Advanced Light Source

Tony Warwick, Advanced Light Source,
Malcolm R. Howells, Advanced Light Source,
Chris J. Jacobsen, Stony Brook University,
Stephen D. Kevan, University of Oregon,
Janos Kirz, Advanced Light Source,
John C. H. Spence, Arizona State University

With the Advanced Light Source upgrade to top-off operation during this calendar year, the brightness of the source and hence the coherent soft X-ray flux will increase by an order of magnitude or more. With a dedicated elliptically polarizing undulator, and optimized beamline designs, we expect to dramatically increase the capabilities available at the ALS for diffraction microscopy and X-ray Photon Correlation Spectroscopy. Construction of this facility, named COSMIC has been designated the top priority in the ALS Strategic Plan.

The beamlines designed for COSMIC are based on a pair of coherence conserving spherical grating monochromators. The operation is almost paraxial so that a very simple scheme can deliver the modest spectral resolution required, with just two focussing optics, one of which is a spherical grating. The highest priority is coherence preservation through the beamline, into a field of the order 10 microns, for coherent sample illumination. Details of the beam line design will be presented. This work was supported by the U.S. Department of Energy under contract number DE- AC02-05CH11231.

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