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Latest progress on two new ALS-U beamlines for diffraction-limited performance

Tuesday 16 September 2025 17:00 (1 hour)

The Advanced Light Source Upgrade (ALS-U) will increase soft X-ray coherent flux by 100×. We developed two new beamlines—COSMIC and MAESTRO—engineered to minimize loss of brightness and utilize the advanced coherence of the light source. Each beamline uses a minimalist optical layout: a cryo-cooled M1 mirror, a monochromator with variable-line-spacing gratings, and a final focusing M3 mirror. Optics are designed for Strehl ratio > 0.8 and sub-100 nrad vibration. A piezo-bimorph M3 mirror paired with a wavefront sensor allows for the wavefront optimization. Fabrication is underway. New test data include at-wavelength efficiency measurements for blazed gratings, and motion performance of piezo-actuated pitch/roll flexure systems at cryogenic temperatures, granite air-bearing positioners, and monochromators. We will present test results, expected performance, and recent progress updates on the ALS-U project.

Footnotes

Funding Agency

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