

High-Resolution Soft X-Ray Bending Magnet Beamline 9.3.2 with Circularly Polarized Radiation Capability at the Advanced Light Source

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Bending magnet beamline 9.3.2 at the Advanced Light Source (ALS) was designed for high-resolution spectroscopy in the soft x-ray energy region, covering a range from 30 eV to 1.5 keV with three gratings. The monochromator itself is a standard fixed-included-angle spherical grating monochromator (SGM) and was originally used at SSRL as a prototype for later insertion-device-based monochromators for the ALS [1]. For operation at the ALS, the optimal system was improved over that used at SSRL. The toroidal premirror used at SSRL to vertically focus onto the entrance slit and horizontally focus onto the exit slit was replaced by two separate crossed mirrors (Kirkpatrick–Baez configuration). The water-cooled premirror is a horizontally deflecting (5 degrees) tangential cylinder which deflects 7.5 mrad of the horizontal radiation fan and focuses it near the exit slit of the monochromator. The vertically diverging radiation is collected by a 5-degree vertically deflecting spherical mirror which accepts 1.2 mrad and focuses onto the entrance slit of the monochromator with a magnification of 0.60.

Circularly polarized radiation is obtained by inserting a water-cooled movable aperture in front of the vertically focusing mirror to allow selecting the beam either above or below the horizontal plane. To maintain a stable beam intensity through the entrance slit, the photocurrent signals from the upper and lower jaws of the entrance slit are utilized to set a feedback loop with the vertically deflecting mirror piezoelectric drive. The beamline end station has a movable platform that accommodates two experimental chambers, enabling the synchrotron radiation to be directed to either one of the two experimental chambers without breaking the vacuum.

1. P.A. Heimann, F. Senf, W. McKinney, M. Howells, R.D. van Zee, L.J. Medhurst, T. Lauritzen, J. Chin, J. Meneghetti, W. Gath, H. Hogrefe, and D.A. Shirley, *Physica Scripta* **T31**, 127 (1990).