The Macromolecular Crystallography Facility

Crystallography is the only X-ray technique capable of determining the atomic structure of a macromolecule. Structure determination is achieved by collecting a large number of x-ray diffraction patterns on a single crystal and then solving the structure from the data. The heart of the MCF comprises the Advanced Light Source (ALS) beamlines. The ALS is a high-performance, high-brightness, hard-x-ray storage ring. The 5-T magnetic field around the ring is the highest available to macromolecular crystallography. The ALS is a national user facility open to scientists from academia, industrial, and government laboratories. Operated by the Physical Biosciences Division of the Lawrence Berkeley National Laboratory (LBNL), the MCF offers a complete spectrum of experimental X-ray spectroscopic capabilities. Since the beginning of ALS operation for crystallography in November 1997, scientists have successfully collected multiple wavelength-anomalously diffractive (MAD) data, diffraction data from monoclinic specimens, and conventional diffraction data with extremely rapid throughput. By February 1999, more than 300 new users were receiving the service. Receiving the service, high-quality protein samples are shipped to ALS beamlines at least 51 days prior to operation in order to ensure that crystals are available at the beamline 1 day after arrival. Each new user is assigned a dedicated beamline staff scientist to guide the experiment as it proceeds. A dedicated staff scientist also monitors the beamtime. Beamline 5.0.2 is operational.

The Macromolecular Crystallography Facility (MCF) at the ALS now offers users of single crystals the ability to...
A Performance that Stands with the Best

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coming at a beam energy of 1.9 GeV, the ALS is an extraordinary light source that can provide high-intensity monochromatic x-rays for structural research. The beamline 5.0.2 superwiggler, for example, provides a flux of \(10^{16}\) photons/sec • mm\(^2\) • mrad\(^2\) • 0.1% bandwidth, which is in the top percentile of synchrotron sources. The ALS is designed to meet the requirements of high-intensity protein crystallography, and advanced instrumentation in the laboratory is geared to handling the high flux and angular collimation of the synchrotron beam. The ALS is equipped with high-resolution optics, such as superbends, and bend magnets at the ALS shows that at the MCF is competitive with existing facilities for protein crystallography.

For More Information

Operating as a national user facility, the MCF is open around the year to scientists from academic, industrial, and government laboratories, who may work in collaboration with MCF scientific staff or submit proposals that will be peer-reviewed as part of the Independent Researcher program at the ALS. For more information, please visit our website [www.berkel...](http://www.berkel...)

Getting to the MCF/ALS

The Berkeley Lab is located on a site in the hills directly above the campus of the University of California, Berkeley, and is easily accessible by automobile from anywhere in the San Francisco Bay Area and by BART or BART to San Francisco and Oakland airports. The Bay Area Rapid Transit (BART) system provides convenient access via routes in downtown Berkeley. Berkeley Lab operates weekday shuttle services on site to shuttle between locations around the UC campus and downtown Berkeley to the laboratory and an on-site shuttle. The MCF is located in Building 6 (the ALS building) with the crystallography station on the experimental floor and office spaces.

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