Advanced Light Source

The Advanced Light Source (ALS) at Lawrence Berkeley National Laboratory generates light at wavelengths required for “seeing” into the world of atoms and electrons, establishing the scientific foundations for the breakthroughs needed for the 21st-century material technologies.

How Does the ALS Work?
When electron bunches traveling at near the speed of light are forced into a circular path by magnets, they emit beams of “synchrotron light” that are a billion times brighter than the sun. At the ALS, the emitted light covers the spectrum from the infrared through the ultraviolet up to soft (long-wavelength) and hard (short-wavelength) x-rays. The ALS, a world leader in soft x-ray science, provides synchrotron light to 40 independent experimental stations, each optimized for one or more research techniques or scientific areas.

Societal Impact

The Science of Matter is Science that Matters
The wavelengths of light generated at the ALS have just the right size and energy range for examining the atomic and electronic structure of matter. These two kinds of structure determine nearly all the commonly observed properties of matter, such as strength, chemical reactivity, thermal and electrical conductivity, and magnetism. A clearer understanding of such structures is the first step toward eventually designing new materials that better serve society, such as more compact electronics, more effective medicines, and more efficient solar cells.

Over half the researchers at the ALS are young trainee scientists who will make key contributions to U.S. competitiveness in the future.