

Operations at the National Synchrotron Light Source II (NSLS-II) are scheduled to begin in 2015. NSLS-II will offer ultra-bright light and state-of-the-art amenities, which will draw top scientists from around the world to conduct groundbreaking research in many fields, including energy, biology, medicine, and materials science.

## NSLS-II by the Numbers

*World's Premier Synchrotron Will Light the Way to New Discoveries*

Like all synchrotrons, the National Synchrotron Light Source II (NSLS-II) at Brookhaven National Laboratory will generate light by accelerating a beam of electrons around a large ring. As the electrons circle, they emit light of varying wavelengths, from infrared to x-rays.



When operations begin in 2015, NSLS-II will be the world's leading storage-ring-based synchrotron light source.

field of Yankee Stadium inside the NSLS-II ring, with so much extra room that you might never see a homerun!

- At multiple points around the ring, the light is directed down “beamlines” to research equipment. When built to full capacity, NSLS-II will have approximately 60 beamlines.
- NSLS-II will be 10,000 times brighter than Brookhaven’s existing National Synchrotron Light Source.
- NSLS-II will allow researchers to “see” details down to incredibly tiny scales, possibly even a single nanometer, or a billionth of a meter—small enough to resolve single molecules.
- To achieve this unprecedented resolution, the electron beam must be very stable, not exceeding a vibration threshold of more than 25 nanometers in any direction. This is 1,000 times smaller than what can be detected by your fingertip.
- The electrons are guided in their circular path by the powerful magnetic fields produced by 660 large magnets, some more than 13 feet long and weighing more than 6,000 pounds.
- NSLS-II will have a very large footprint. Its main ring will have a circumference of 792 meters—nearly half a mile. You could fit the playing

- In one second, each electron will circle the ring

about 375,000 times—that’s more than 99 percent of the speed of light.

- NSLS-II will draw up to 20 megawatts of power, or as much as needed to power about 300,000 light bulbs.
- Cooling the facility will require 2,500 tons of mechanical refrigeration and 1,800 tons of cooling tower capacity.
- NSLS-II was constructed with 3,100 tons of steel and 42,000 cubic yards of concrete.
- The completed NSLS-II facility has 600,000 square feet of space.
- NSLS-II is making a significant impact on the local economy. By the time the NSLS-II Project is complete, Brookhaven Lab will have purchased \$912 million in labor and materials. That breaks down to about \$286 million in labor, most of it supplied by the local labor market, and \$626 million in materials, much from local contractors and vendors.



Former Energy Secretary Steven Chu views NSLS-II prototype magnets.