Purpose
To provide extremely bright x-rays for basic and applied research in biology and medicine, materials and chemical sciences, geosciences and environmental sciences, and nanoscience and technology.

Sponsor
U.S. Department of Energy (DOE), Office of Science, Office of Basic Energy Sciences.

Features
State-of-the-art, medium-energy storage ring. Complements Nation's existing sources, providing an order of magnitude more brightness in the soft to medium energy regime. World-leading brightness from infrared light to hard x-rays.

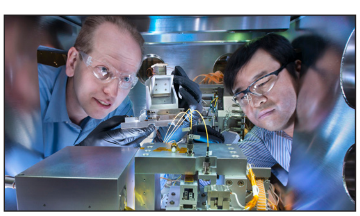
Users
More than 900 researchers from universities, national laboratories, and industry this year alone

Tools for Discovery Science
NSLS-II operates 19 state-of-the-art beamlines, with 10 more beamlines under construction. Each beamline offers unique, cutting-edge research tools including:

- Hard X-ray microscope with world-leading, nanometer spatial resolution
- High-throughput robot-driven sample processing
- Coherent scattering with unprecedented spatial and temporal resolution
- Beamlines designed and built in partnership with on-site facilities, federal agencies, and industry

Potential to add another 30 beamlines serving 4000 visiting scientists per year

http://www.bnl.gov/nsls2



Looking inside the Hard X-ray Nanoprobe beamline at NSLS-II

The National Synchrotron Light Source II

The National Synchrotron Light Source II (NSLS-II) at Brookhaven National Laboratory is one of the newest, most advanced synchrotron facilities in the world and a U.S. Department of Energy (DOE) Office of Science User Facility.

A portion of NSLS-II at Brookhaven Lab

As a world-class light source, NSLS-II opened its doors to users just two years ago and is enabling its growing user community to study materials with nanoscale resolution and exquisite sensitivity by providing cutting-edge capabilities for x-ray imaging and high-energy resolution analysis. Researchers from around the globe come to NSLS-II to focus on the most important challenges at the nanoscale in fields such as condensed matter and materials physics, chemistry, and biology.

Meeting Critical Challenges

Meeting the critical scientific challenges of our energy future requires advanced new and unique capabilities. These are being provided by NSLS-II.

NSLS-II is a state-of-the-art, medium-energy electron storage ring (3 billion electron-volts) with a highly stable electron beam. It is designed to deliver world-leading intensity and brightness and offers specialized *in operando* experimental conditions as well as multiscale and multimodal measurements allowing complex problems to be addressed with multiple techniques.

The facility also partners with Brookhaven's Center for Functional Nanomaterials—another DOE Office of Science User Facility— to integrate its nanoscale synthesis and analysis tools with the synchrotron tools of NSLS-II to enable unprecedented exploration of the new materials that are expected to transform the nation's energy future.

Examples of Discovery-Class Science

Self-assembly
Nanoscale imaging will enhance scientists' understanding of how to create large-scale structures from nanometer-scale building blocks. This research will lead to design approaches that mimic nature to assemble nanomaterials into useful devices more simply and economically.

Clean and Affordable Energy
Imaging highly reactive gold nanoparticles inside porous hosts and under real reaction conditions will lead to new materials that use sunlight to split water for hydrogen production and harvest solar energy with high efficiency and low cost.

Molecular Electronics
NSLS-II allows scientists to observe fundamental properties with nanometer scale resolution and atomic sensitivity. For example, new electronic materials beyond silicon could be used to make faster, less expensive, more energy efficient electronics.

Structural Biology
The complex building blocks of biological systems should link together like well-oiled machines. At NSLS-II we are uncovering the 3-dimensional design of biological molecules and will watch them in action as the first step towards designing more effective drugs to combat disease.

(07/17)