

The U.S. Department of Energy (DOE) funds Brookhaven and nine other national laboratories across the country. The Lab is operated for DOE by Brookhaven Science Associates (BSA), a nonprofit, limited-liability company founded by Battelle and Stony Brook University.

Our Commitment

BSA's goal is to enable the Lab's researchers to undertake forefront research in science, engineering, and technology while ensuring the quality of Long Island's environment, and the health and safety of the Lab's workers, visiting public, and surrounding community.

Environment and Safety

The Lab is registered under the International Organization for Standardization 14001 environmental management standard, as well as the Occupational Health and Safety Assessment Series 18001 management system standard. It was the first national laboratory to meet these globally recognized standards.

Community

The Lab strives to be an asset to the community through its research, by promoting science literacy, and by welcoming community participation in many activities.

Economy

Brookhaven is one of Long Island's top high-tech employers. From 1993 to 2003, the Lab injected more than \$4.76 billion in direct spending into the N.Y. State economy, increasing the output of goods and services by almost \$9.2 billion and creating almost 79,000 jobs.

Education

Each year, thousands of students from the elementary grades through post-graduate levels take advantage of learning and research opportunities at the Lab.



Brookhaven's Science Learning Center offers interactive programs to students in grades K-8.

Science Learning Center visitors have a hair-raising experience with static electricity.

On the Cover

A magnetic field representation from a quadrupole focusing magnet built by the Lab's Superconducting Magnet Division. Six of these specialty magnets, which operate in liquid helium, were constructed for the HERA collider in Hamburg, Germany.

Inset: At the NSLS, researchers can simulate temperature and pressure conditions for studying the Earth's structure and dynamics.

A Site to See



An aerial view of Brookhaven Lab

More than 30,000 people visit Brookhaven Lab each year. For information on tours, the science museum, and educational and outreach programs, call (631) 344-2345.



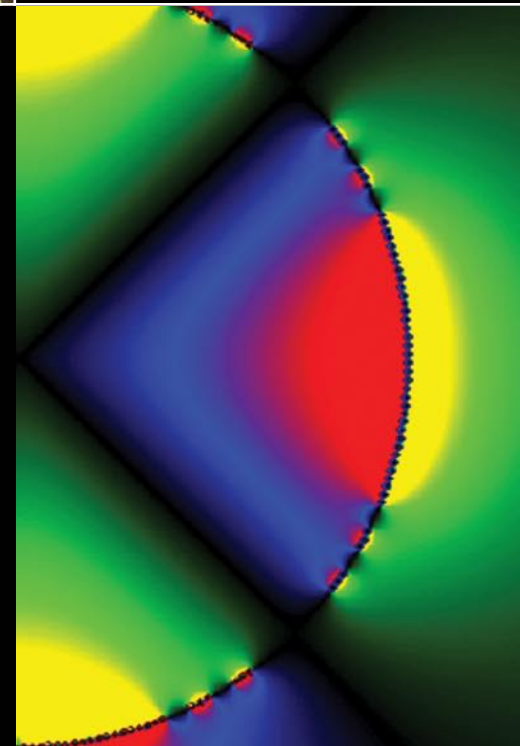
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Science at Brookhaven



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A View of Brookhaven

Brookhaven National Laboratory is a multipurpose research laboratory funded by the U.S. Department of Energy. Located on a 5,300-acre site in eastern Long Island, New York, the Laboratory operates large-scale facilities for studies in physics, chemistry, biology, medicine, applied science, and advanced technology.

Brookhaven's 2,600 scientists, engineers, and support staff are joined each year by more than 5,000 visiting researchers from around the world. Established in 1947 on the grounds of a former U.S. Army base, the Lab is the home of six Nobel Prize-winning discoveries, five for research in physics. Three of these, awarded in 1976, 1980, and 1988, were made using Brookhaven's Alternating Gradient Synchrotron (AGS). The 1957 and 2002 Nobel Prizes were awarded for a theory on parity conservation and the detection of solar neutrinos, respectively. And in 2003, the Nobel Prize in Chemistry was awarded for research performed at Brookhaven's National Synchrotron Light Source (NSLS) that

explains how ion channels generate nerve impulses in the human body.



An experiment at the AGS, site of three Nobel Prize-winning experiments.

Future Frontiers

Brookhaven scientists are expanding our understanding of the properties and function of matter from the microscopic to the cosmic scales. At the Relativistic Heavy Ion Collider (RHIC), a 2.4-mile-circumference particle accelerator designed to replicate conditions microseconds after the Big Bang to better understand subatomic particles and their interactions, a consensus is emerging that the early universe was a nearly "perfect" liquid. At the Center for Functional Nanomaterials (CFN), scientists are probing the unique properties of matter at the nanoscale — on the order of billionths of a meter — with the aim of developing new materials to help solve our nation's energy challenges. And at the NSLS, researchers are probing the inner workings of proteins, superconductors, and magnets in ways that may lead to a wide range of benefits for humankind.

Research Highlights

Brookhaven National Laboratory has a rich history and a bright future in scientific achievement. The following highlights describe facilities and accomplishments that distinguish the Lab.

• Lighting up Discoveries

Using x-rays and ultraviolet and infrared light, the NSLS has been used to decipher the molecular structures of proteins and viruses, to construct micro-machines, and to study magnetism, superconductivity, and other properties of materials. Plans are under way for NSLS-II, which will produce light 10,000 times brighter and help solve increasingly complex scientific problems.

• Liquid Universe

RHIC's finding that the early universe behaves more like a liquid than a gas has enriched physicists' understanding of the theory that describes the interactions of the smallest known components of matter. It has also raised compelling new questions that scientists hope to address using future upgrades to RHIC known as RHIC II and e-RHIC. RHIC experiments also provide clues to the origin of proton spin, a property as fundamental — and potentially useful — as electric charge.

• Medical Marvels

Using positron emission tomography, scientists probe the brain chemistry of addiction, mental illness, and aging, and have begun finding effective treatments for a variety of diseases. Brookhaven was a pioneer in developing technetium-99m, the radiotracer used in 12 million nuclear medicine procedures performed annually in the U.S. L-dopa was developed at the Lab as a treatment for Parkinson's disease.

• Technology Transfer

Brookhaven works with industry to bring technologies to the marketplace in a time- and cost-effective manner, including a safer, more effective x-ray imaging technique and advanced materials for radiation detectors.

"Dancing" nano triangles formed by sulfur atoms on a layer of copper; growing superconducting crystals; RHIC event as observed by the STAR detector.



Nearly 1,000 scientists and engineers call Brookhaven their research home. Over 5,000 more come to use the Lab's facilities each year.

• Advanced Computing

The Lab has designed and developed an award-winning supercomputer for analyzing large volumes of data and handling complex problems such as climate modeling. In 2007, the Lab partnered with IBM and Stony Brook University to bring a N.Y. State-funded 100-teraflop BlueGene/L supercomputer to Brookhaven.

• Environmental Solutions

Lab research has led to a hazardous-waste treatment technology that significantly reduces the potential for releasing stored waste into the environment. The development of bacteria that eat oil, grease, and toxic waste has yielded applications in purifying crude oil and recovering metals from geothermal mining waste.

• Energy Alternatives

Brookhaven's research programs seek breakthroughs and advances in the use of renewable energy through improved conversion, transmission, and storage. The Lab's portfolio features research in biofuels, solar energy, nuclear energy, and energy efficiency and storage.

• Investigating the Ultrasmall

The CFN provides researchers with state-of-the-art tools to fabricate and study nanomaterials. These materials — typically on the scale of billionths of a meter — offer different chemical and physical properties than bulk materials, and could lead to new technologies.

• Counterterrorism Initiatives

The Lab has developed advanced capabilities and expertise that contribute to counterterrorism efforts in the U.S. and abroad. Brookhaven researchers develop cutting-edge, science-based technologies to help predict, detect, preempt, and respond to terrorism.

• Global Change

Lab scientists study the effects of aerosol particles, greenhouse gases, and other air pollutants on global climate, plant growth, and human health.

• Nuclear Safety

Brookhaven's nuclear science experts engage in several international efforts to safeguard nuclear materials, limit the spread of nuclear weapons, and improve the safety of nuclear reactors worldwide.