

Purpose

To study the fundamental properties of matter from elementary atomic particles to the evolution of the universe

Sponsor

U.S. Department of Energy's (DOE) Office of Nuclear Physics

Replacement Cost

~\$2 billion

Features

- Two crisscrossing rings of 1,740 superconducting magnets in a 2.4-mile tunnel
- Two complementary, state-of-the-art detectors: PHENIX and STAR
- Collides everything from polarized protons to heavy nuclei across an unmatched range of beam energies

Users

Over 1,000 per year from national and international laboratories, universities, and other research institutions

Strong Support

The nation's Nuclear Science Advisory Committee expresses strong support for RHIC, recommending a budget that *"will allow the U.S. to preserve the tools that enable our science...the minimal budget for a viable U.S. program that maintains leadership in the core areas of nuclear science."*

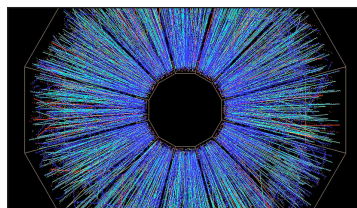
— 2012 NSAC Subcommittee Report to DOE Office of Science and NSF

The committee ranks *"RHIC as absolutely central in its ability to contribute to world-leading science in the next decade."*

— 2013 NSAC Subcommittee Report on Scientific Facilities

The President's FY16 budget request would support the goals of RHIC and fund the research of its users across the country.

www.bnl.gov/rhic



Thousands of particle tracks at STAR

Exploring Matter at the Dawn of Time

The Relativistic Heavy Ion Collider: Inspiring Science and Innovation

Scientists' quest to understand the early universe and interactions among its fundamental particles has inspired the design, construction, and continuous improvement of the Relativistic Heavy Ion Collider (RHIC), the world's most versatile particle collider. The

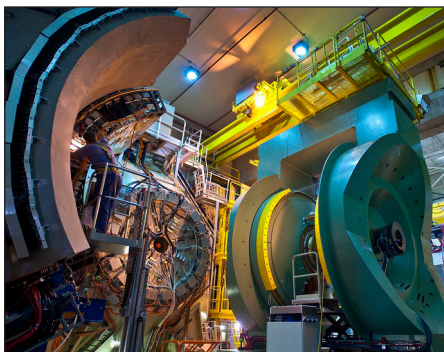
research conducted at RHIC attracts the world's best and brightest minds, inspires a new generation of scientists, and drives technological advances in many fields. RHIC is a vital national resource for cutting-edge discovery, accelerator science and engineering R&D, future workforce development, and continued U.S. leadership in science and technology.

Only Collider in the U.S.

- RHIC is the only U.S. collider, and the world's only polarized proton collider.
- RHIC collides particles over a wide range of energies to explore details of the transition between matter at the dawn of time to the atomic nuclei that make up 99 percent of the mass of visible matter in the universe today.
- Physicists from RHIC and Europe's Large Hadron Collider (LHC) agree that both RHIC and LHC are needed to fully study early-universe matter.

Unmatched Versatility, Productivity

- Record-setting collision rates and proton polarization
- Access to wide variety of ions and beam energies for controlled studies
- Newly upgraded detectors with precision capabilities
- 380+ scientific papers, including 60 of the field's 100 most-cited
- 380+ PhDs, hundreds more to come
- 200+ tenured or tenure-track faculty and research positions in states across the U.S.



PHENIX, one of RHIC's particle-tracking detectors

Strategic Impact

- Attracts/serves more than 1000 scientists from around the world
- Supports 1,469 full-time equivalent jobs
- Generates more than \$180 million in annual economic output
- Triggers spin-off benefits including:

medical isotopes for heart scans and cancer treatment; studies of space radiation to protect future astronauts; accelerator advances that could improve cancer treatment and nuclear reactor safety; R&D to advance energy storage; and computational approaches for managing "big data" in many fields

- Inspires and trains hundreds of students for careers in science, technology, engineering, and mathematics (STEM)
- Develops the high-tech workforce needed to address broad-impact scientific and technical challenges in communications, energy technologies, national security, medicine, and more
- Positions the U.S. as a leader in science

RHIC's Role in the Future

- A strong RHIC community is a key piece of the scientific and technological foundation for the next-generation research facility for nuclear science, an Electron-Ion Collider (EIC).
- RHIC infrastructure can provide an affordable path to an EIC, enabling continued U.S. leadership in nuclear physics and ancillary benefits for decades to come.
- Sufficient funding for RHIC is essential for a smooth transition that preserves scientific talent, international collaborations, and foreign investments.
- If RHIC didn't exist, something like it would have to be built at much greater cost.