

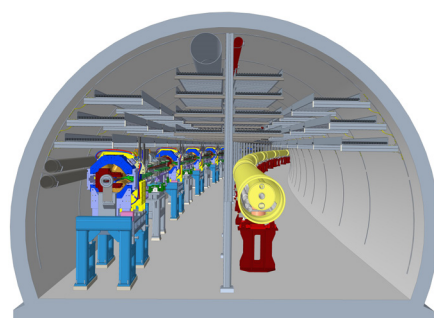
# The Electron-Ion Collider

U.S.-led discovery machine built in collaboration with global partners

The Electron-Ion Collider (EIC) is a unique research facility that will explore long-elusive mysteries of visible matter. It will unlock the secrets of the atomic nucleus and provide insight into its innermost building blocks and the strongest force in nature. As one of the most challenging and exciting accelerator complexes ever built, the EIC will attract the world's best and brightest scientists and engineers to expand the boundaries of accelerator and particle detector technologies with benefits for U.S. science, industry, and society.

## Leveraging existing infrastructure and expertise

The EIC will leverage existing investments and infrastructure, including key components of the Relativistic Heavy Ion Collider (RHIC), a U.S. Department of Energy (DOE) Office of Science user facility that has been making groundbreaking discoveries since 2000. RHIC, representing a \$2 billion federal investment at Brookhaven Lab over the past three decades, will complete its scientific mission at the end of 2025. Reusing the most complex components of RHIC's infrastructure reduces the cost of building the EIC relative to starting from scratch.



Specifically, the EIC will reuse:

- One of RHIC's ion rings (yellow), including more than 1,000 superconducting magnets
- RHIC's ion sources and pre-accelerator chain (orange)
- The 2.4-mile-circumference RHIC tunnel
- One or more large detector halls
- Support buildings, roads, electrical supplies, refrigeration facilities, and other existing infrastructure

Hundreds of physicists, engineers, and technicians — many currently working at Brookhaven Lab and Jefferson Lab — will build and operate the EIC. Thousands of researchers representing the global user community will bring decades of invaluable experience operating detectors to maximize the scientific output of this groundbreaking discovery machine.

**“We recommend the expeditious completion of the EIC as the highest priority for facility construction.”**

— U.S. Nuclear Science Advisory Committee

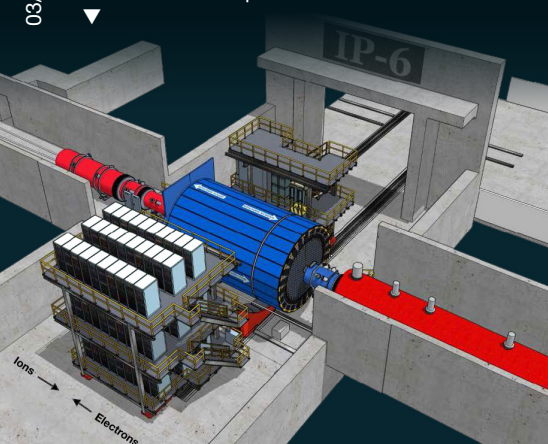
## Pioneering particle collider

The EIC being built at DOE's Brookhaven National Laboratory in partnership with DOE's Thomas Jefferson National Accelerator Facility (Jefferson Lab) will be the only operating particle collider in the U.S. Superconducting radiofrequency cavities will accelerate beams of electrons and protons or other atomic nuclei (ions) while powerful magnets steer these particles in opposite directions around the rings and into collisions. Additional advanced components required to build the EIC include:

- Vacuum systems, power supplies, and cryogenic refrigeration systems
- A sophisticated, multicomponent detector with thousands of microelectronic sensors to detect, track, and characterize particles produced in collisions
- Advanced computational tools for managing and analyzing data and sharing it with collaborators around the world.

This project will push the envelope on the design and manufacture of each of these technologies.

ePIC detector in place in the EIC beamline



03/2025



## U.S. leadership, allied support

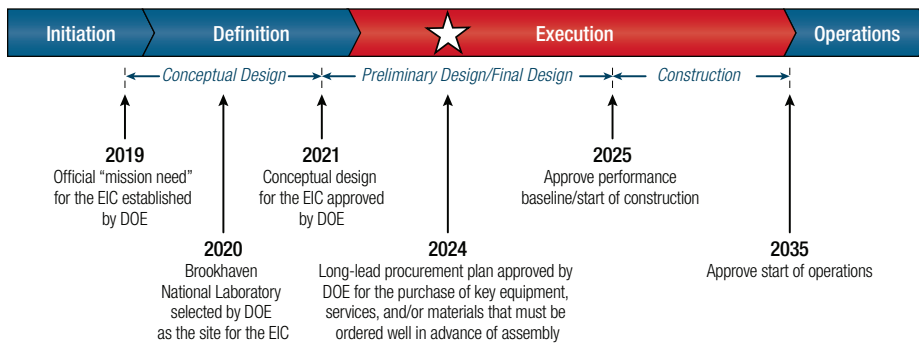
Scientists from Brookhaven Lab and Jefferson Lab — as well as six other DOE national laboratories, 19 U.S. universities, and institutions from 20 countries — are developing technologies needed to build the EIC. More than 1,500 scientists from nearly 300 institutions around the U.S. and the world are engaged in developing the science program and experiments for this unique machine. This worldwide interest has inspired international partners to make significant contributions:

- The United Kingdom pledged £58 million (\$75 million) to develop new accelerator and detector infrastructure for the EIC project.
- Multiple foreign science agencies are in discussions about making funding and/or in-kind contributions to the EIC, and two French agencies have signed Statements of Interest.

## Preserving scientific and technical talent

A successful transition from RHIC to an operational EIC relies on retaining the existing highly skilled workforce to begin EIC construction when RHIC completes its scientific mission at the end of 2025. This timeline would allow the project to productively engage and continue supporting about 200 staff members with decades of accelerator and detector experience. Otherwise, the project risks permanently losing a portion of this crucial workforce and experiencing potential delays, including an extended gap in nuclear physics discoveries between the end of RHIC operations and start-up of the EIC. Reassembling such a specialized team would be challenging.

## EIC project timeline

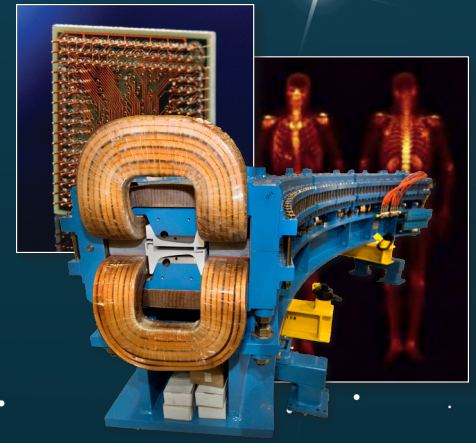


## Leveraging critical investments to meet milestones

In addition to leveraging the \$2 billion in existing RHIC infrastructure, the EIC project is expected to cost approximately \$2.8 billion.

- To date, Congress has provided more than \$400 million to support the EIC project.
- New York State is contributing an additional \$100 million toward construction of EIC buildings and other conventional infrastructure — a strong endorsement of Brookhaven Lab's contributions to Long Island, the state, the nation, and future U.S. scientific leadership.
- In fiscal year (FY) 2026, a significant portion of funding previously supporting RHIC operations will be available to be redirected to EIC construction.

**Scientists across the nation and around the world are conducting critical EIC design work and developing key technologies so the project can move seamlessly into construction when RHIC's funding, infrastructure, and highly skilled workforce become available.**



## Benefits beyond science

- History has shown that a deeper understanding of the structure of matter and fundamental forces — often gained through accelerator experiments — has produced countless benefits for society, including energy systems, medical technologies, and advances in electronics.
- Designing, constructing, and running the EIC will create a wide variety of highly skilled jobs — from construction to science and engineering — and provide educational opportunities and training for a future tech-based economy.
- People working at and visiting the EIC will spend money regionally with positive impacts on the local, state, and national economy.

*The EIC will be a world-class discovery machine that will maintain leadership in key technologies at the heart of U.S. competitiveness.*