

A collider conversion

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The Relativistic Heavy Ion Collider (RHIC), at Brookhaven National Laboratory in Upton, New York, completed its 25th and final run of particle collisions in February. Shown at the top of this aerial image, the 3.8-km-circumference tunnel that contains two ion storage rings used for RHIC will be converted into the Electron-Ion Collider, a facility for studying the strong nuclear force. The project is expected to cost \$2.8 billion, and the collider is slated to begin science operations by the mid 2030s. Engineers plan to make use of RHIC's ion source and one of its large ion storage rings, while adding an electron source and accelerator and replacing one of the large ion storage rings with an electron storage ring.

The last run at RHIC, like its first in 2000, began with experiments that entailed smashing together beams of gold nuclei at nearly the speed of light. Those high-energy collisions were designed to melt protons and neutrons into a quark-gluon plasma like the one that likely formed just microseconds after the Big Bang. Researchers announced in 2005 that RHIC experiments had shown that quark-gluon plasma behaves as a frictionless liquid rather than exhibiting the gaseous behavior that had been theorized prior to measurements.

During the 30 weeks of the final run, one of RHIC's detectors, sPHENIX, captured some data continuously rather than through the typical approach of taking targeted snapshots of collisions. The run generated over 200 petabytes of raw data—more than had been collected in all previous RHIC experiments combined. **PT**