RHIC by the Numbers

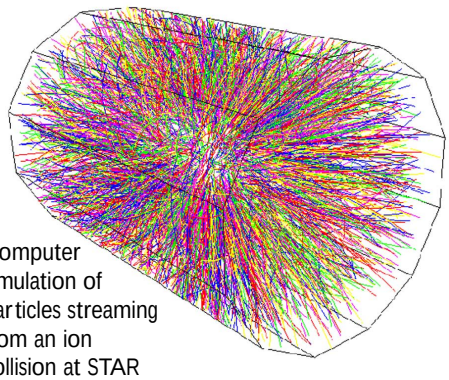
More than a thousand physicists from around the world are using Brookhaven's Relativistic Heavy Ion Collider to study what the universe may have looked like in the first few fractions of a second following the Big Bang.

RHIC's rings consist of 1,740 superconducting magnets.

- RHIC's beam travels at 99.995 percent the speed of light (186,000 miles per second, or more than 300,000,000 meters per second).
- RHIC's beam is not continuous — it's made up of 57 separate "bunches," each containing billions of ions.
- RHIC ions make 80,000 trips around the ring every second, with beam lifetimes of up to 10 hours.
- Thousands of RHIC collisions take place each second. Each collision sends out a shower of thousands of subatomic particles.
- If quark-gluon plasma is formed in a RHIC collision, it lasts less than 0.00000000000000000000001 seconds, or ten millionths of a billionth of a billionth of a second.
- The temperature inside a RHIC collision reaches more than one trillion degrees, 40,000 times hotter than the center of the sun.
- RHIC ions are so small that, even at nearly the speed of light, the force of their impact is about the same as the impact of two mosquitos colliding.
- Over 20 years, RHIC will use less than one-millionth of a gram of gold.
- RHIC's two criss-crossing 2.4-mile rings are made up of 1,740 superconducting magnets strung end-to-end like beads on a necklace.

The STAR detector at RHIC

- RHIC is powered by more than 13,000 miles of superconducting niobium titanium wire wrapped around the RHIC magnets.
- To make the 1,740 superconducting magnets carry electricity without resistance, RHIC magnets are cooled by liquid helium to minus 452 degrees Fahrenheit, nearly absolute zero. (Absolute zero is minus 459 degrees Fahrenheit, or minus 273 degrees Celsius — the coldest anything can be.)
- In all, RHIC contains seven tons of helium — enough to fill all the balloons in the Macy's Thanksgiving Day Parade for the next 100 years!
- To chill the helium, RHIC's refrigerators draw 15 megawatts of electrical power. (One megawatt is enough to power 1,000 homes.)
- RHIC's two large experiments, STAR and PHENIX, are bigger than houses. PHENIX weighs 3,000 tons and STAR weighs 1,200 tons.



Computer simulation of particles streaming from an ion collision at STAR

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