

Big Bang Machine:

Will it destroy Earth

Will the "Big Bang" Machine Destroy the Earth?

Creation of a black hole on Long Island?

A NUCLEAR accelerator designed to replicate the Big Bang is under investigation by international physicists because of fears that it might cause "perturbations of the universe" that could destroy the Earth. One theory even suggests that it could create a black hole.

Brookhaven National Laboratories (BNL), one of the American government's foremost research bodies, has spent eight years building its Relativistic Heavy Ion Collider (RHIC) on Long Island in New York state. A successful test-firing was held on Friday and the first nuclear collisions will take place in the autumn, building up to full power around the time of the millennium.

Last week, however, John Marburger, Brookhaven's director, set up a committee of physicists to investigate whether the project could go disastrously wrong.

It followed warnings by other physicists that there was a tiny but real risk that the machine, the most powerful of its kind in the world, had the power to create "strangelets" - a new type of matter made up of sub-atomic particles called "strange quarks".

The committee is to examine the possibility that, once formed, strangelets might start an uncontrollable chain reaction that could convert anything they touched into more strange matter. The committee will also consider an alternative, although less likely, possibility that the colliding particles could achieve such a high density that they would form a mini black hole. In space, black holes are believed to generate intense gravitational fields that suck in all surrounding matter. The creation of one on Earth could be disastrous.

Professor Bob Jaffe, director of the Centre for Theoretical Physics at the Massachusetts Institute of Technology, who is on the committee, said he believed the risk was tiny but could not be ruled out. "There have been fears that strange matter could alter the structure of anything nearby. The risk is exceedingly small but the probability of something unusual happening is not zero."

Construction of the £350m RHIC machine started eight years ago and is almost complete. On Friday scientists sent the first beam of particles around the machine - but without attempting any collisions.

Inside the collider, atoms of gold will be stripped of their outer electrons and pumped into one of two 2.4-mile circular tubes where powerful magnets will accelerate them to 99.9% of the speed of light.

The ions in the two tubes will travel in opposite directions to increase the power of the collisions. When they smash into each other, at one of several intersections between the tubes, they will generate minuscule fireballs of superdense matter with temperatures of about a trillion degrees - 10,000 times hotter than the sun. Such conditions are thought not to have existed - except possibly in the heart of some dense stars - since the Big Bang that formed the universe between 12 billion and 15 billion years ago.

Under such conditions atomic nuclei "evaporate" into a plasma of even smaller particles called quarks and gluons. Theoretical and experimental evidence predicts that such a plasma would then emit a shower of other, different particles as it cooled down.

Among the particles predicted to appear during this cooling are strange quarks. These have been detected in other accelerators but always attached to other particles. RHIC, the most powerful such machine yet built, has the ability to create solitary strange quarks for the first time since the

universe began.

BNL confirmed that there had been discussion over the possibility of "perturbations in the universe". Thomas Ludlam, associate project director of RHIC, said that the committee would hold its first meeting shortly.

John Nelson, professor of nuclear physics at Birmingham University who is leading the British scientific team at RHIC, said the chances of an accident were infinitesimally small - but Brookhaven had a duty to assess them. "The big question is whether the planet will disappear in the twinkling of an eye.

It is astonishingly unlikely that there is any risk - but I could not prove it," he said.

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