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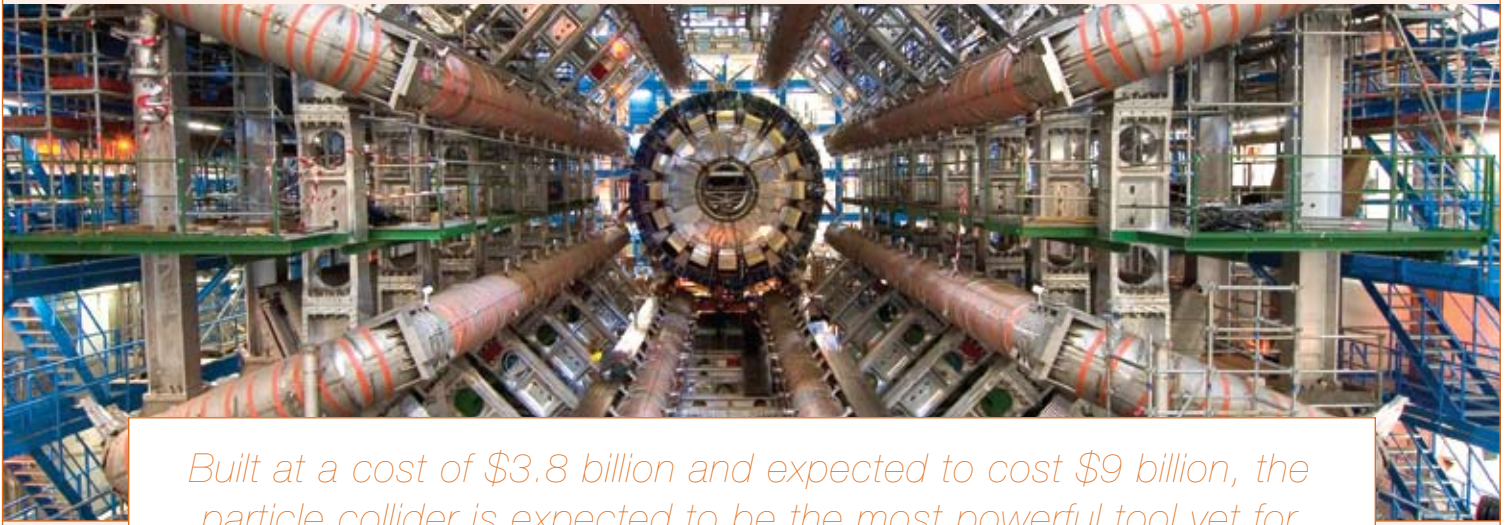
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## Repairs on Large Hadron Collider Will Take Longer than Expected

Courtney Sparkman



*Built at a cost of \$3.8 billion and expected to cost \$9 billion, the particle collider is expected to be the most powerful tool yet for physicists hoping to discover the secrets behind the laws of physics.*

Repairs on the Large Hadron Collider could take until early summer and cost at least 25 million Swiss francs, which is equal to 20.4 million US dollars.

An electrical malfunction shut down the particle collider in September. According to a spokesman for the European Organization for Nuclear Research (known by the French acronym CERN), James Gillies, fixing the particle collider will probably take longer than expected.

Spokesman Gillies is projecting the massive physics experiment to restart at the end of June or later. "If we can do it sooner, all well and good. But I think we can do it realistically (in) early summer," he said.

The collider, which is in an underground facility close to Geneva, Switzerland, uses a ring of super-cooled magnets to push protons. These magnets push protons to energies and speeds never observed and crash the protons together in order to detect a host of new particles.

Built at a cost of \$3.8 billion and expected to cost \$9 billion, the particle collider is expected to be the most powerful tool yet for physicists hoping to discover the secrets behind the laws of physics. From the tiny scale of quantum mechanics to the huge scale of galaxies and black holes, the particle accelerator should help scientists better understand these laws.

The collider has had quite a few operational problems even before its brief running in September.

After nine days of operation, a meltdown of a small electrical connection caused the release of a large amount of liquid helium into the 27 kilometer long tunnel, CERN officials reported.

The facility will shut down operations during the winter in order to conserve energy at a time when Europe has a higher power demand.

Repair work on this ambitious project is time consuming because it has to be warmed to normal temperatures before any repairs can be made. The magnets are cooled at temperatures near absolute zero to make them superconductive. Such an environment makes particle acceleration easier.

Researchers plan to work on repairs during the winter months and hope to have the magnets cold enough for operation by August 2009. Though the repair work is within the budget, the delays are a blow to the physics community, which has been anxiously waiting for the results from this experiment.

One thing physicists expect to find is evidence of the Higgs boson, a particle believed to impart mass on most other particles.

The Higgs boson is a key component in the Standard Model of particle physics, which has helped explain the interactions of quarks, electrons, photons, and quarks for over thirty years. The particle has never been found, and there is no scientific consensus regarding what the basic characteristics of the particle are.