Large Hadron Collider

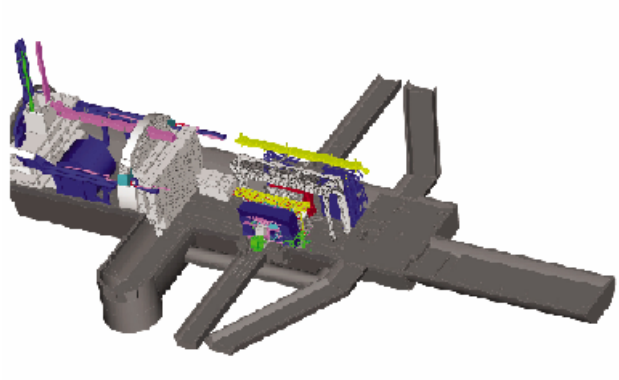
In 2007, the Large Hadron Collider (LHC) will begin colliding protons at center-of-mass energies of 14 tera-electronvolts (TeV), while the first collision of lead ions at 5.5 TeV is expected to commence in 2008. The Collider will be 27 km in circumference and will be put 50-175 m underground. The cost of building the LHC is around 2,300 million US dollars. The LHC is located at CERN (Centre Européen pour la Recherche Nucléaire) situated on the French and Swiss borders.

To investigate the most fundamental grains of the universe, we have to use the largest, most elaborate machines. To bend such high-energy particles around the cyclic ring, the LHC's niobium-titanium superconducting magnets will operate at 8 tesla, at a temperature of 1.9 kelvin (-271°C). LHC will push the boundary of science into the energy regime never before achieved. The Collider will open the door for scientists to study the most fundamental particles and their interactions.

The center of mass energy of nucleus-nucleus collision at LHC will be about 30 times that of the current highest (200 GeV Au+Au at RHIC). Physics of quark-gluon plasma (QGP) will be studied in these heavy-ion collisions. The main detector to study Pb+Pb data is ALICE. The proton-proton collisions will be run at over 10 times the current highest p+p energy (1 TeV at the Tevatron). They will be the reference to the high-multiplicity Pb+Pb results. The collisions between protons at such high energies will also be the tool in investigating the exotic particles such as Higgs and SUSY, as well as testing various aspects of the Standard Model. CMS (Compact Muon Solenoid) and ATLAS will be the main detectors for p+p collisions. The other huge detector at LHC is called LHCb which will study CP violation in the decays of B mesons.

CMS

ATLAS



LHCb

ALICE

For more information see http://www.interactions.org/LHC/ and http://lhc.web.cern.ch/lhc/.

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