LHC to narrow search for Higgs boson

8 December 2011

Scientists at the world's largest atom smasher have new data that shows with greater certainty where to find a long-sought theoretical particle that would help explain the origins of the universe.

Physicists at CERN, the European Organization for Nuclear Research near Geneva, told The Associated Press on Thursday that reams of new data will help in the search for the Higgs boson, whose existence is theorized under the main particle physics theory that explains the Big Bang.

Finding it would be an enormous scientific breakthrough for the physics world and would help explain why different particles have different masses. That is because the particle itself is thought to give mass to other particles, and thus to objects and creatures in the Universe.

CERN scientists say their data from two main experiments using CERN's $10-billion Large Hadron Collider under the Swiss-French border will be made public next Tuesday, but any firm discovery will have to wait until next year.

They say the data helps narrow the region of the search because it excludes some of the higher energy ranges where the Higgs boson might be found, and shows some intriguing possibilities involving a small number of "events" at the lower energy ranges.

"What's exciting is we know we're close to getting something in focus. We know we're close to the stage where we're going to see something," said Joe Incandela, a physicist who will lead one of CERN's two main experiments next year.

"We're really right at the boundary of where you might get a vague hint of something," he said. "But whenever you're talking about that small number of events, there's no real statement you can make."

Thousands of researchers around the world have been poring over the data generated at the collider, and many expect it to produce significant discoveries about the makeup of matter and other mysteries of the universe.

High energy beams of protons are sent crashing into each other though a 17-mile (27-kilometer tunnel) to see what happens when they collide. The protons travel at incredible speeds in conditions simulating those 1 trillionth to 2 trillionths of a second after the Big Bang.

Physicists once thought protons and neutrons were the smallest components of the atom's nucleus, but colliders showed they are made of quarks and gluons and that there are other forces and particles.

Speculation about progress in the hunt for the precise level of energy where the Higgs boson might be found had the physics world and blogosphere buzzing Thursday.

An American scientist who's collaborating in the hunt for the Higgs boson said people are really excited about the new CERN data but it will be another year before anything that is definite.

"There's a lot of drama," said Drew Baden, chair of the physics department at the University of Maryland. "It's not anything anybody can look at and say, 'There it is.' "

The hunt for the Higgs boson is different than the much-publicized research by French and Italian researchers that appeared to show subatomic neutrino particles traveling faster than light.

But scientists at CERN are involved in testing that research, which would show neutrinos breaking what Nobel Prize-winning physicist Albert Einstein considered the ultimate speed barrier.