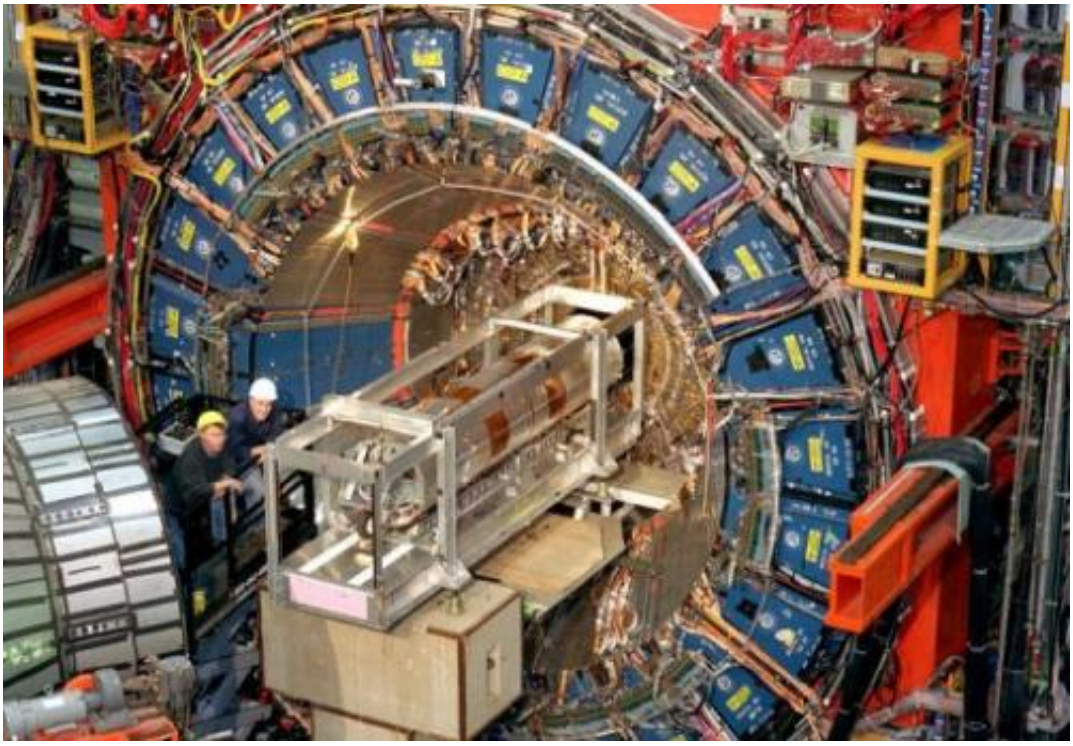
More clues soon in hunt for Higgs particle

July 1 2012, by Jean-Louis Santini



Scientists work at the three-story, 6,000-ton CDF Collider Detector at Fermilab) in the Fermi National Accelerator Laboratory (Fermilab), just outside Batavia, Illinois. Fermilab may next week announce more clues in the worldwide hunt for an elusive sub-atomic particle, the Higgs boson, that is the missing piece in the standard model of physics.

More clues are expected next week in the worldwide hunt for an elusive sub-atomic particle, the Higgs boson, that is the missing piece in the standard model of physics.

Sometimes referred to as the "God particle" because it seems to be everywhere, the Higgs boson is believed to give objects mass, but physicists armed with the world's most potent atom-smashers have yet to identify it.

Ever since it was first proposed in the 1960s, international physicists have endeavored to find the particle, and wondered what it might mean for scientific theory if it cannot be found.

In December 2011, scientists at the European Center for Nuclear Research announced "tantalizing hints" that the sought-after particle was hiding inside a narrow range of mass.

The clues came from CERN's Large Hadron Collider -- the world's largest atom-smasher, located along the French-Swiss border -- showing a likely range for the Higgs boson between 115 to 127 gigaelectronvolts.

US-based experiments echoed those findings, though in a slightly larger range.

On Monday, scientists working at the Fermi National Accelerator Laboratory (Fermilab) in the midwestern US state of Illinois will announce their latest Higgs search results based on data from Tevatron experiments there.

The Tevatron was a potent atom-smasher that began its collider work in 1985 and closed down last year, but physicists have continued to scrutinize its data in the hunt for the Higgs.

Then, scientists at the Large Hadron Collider will unveil their latest findings on July 4.

CERN spokesman James Gillies told AFP by telephone that there are

three possibilities for that announcement.

"We will be able to say whether either there is nothing in the data this year; or there are still hints in the data, but not strong enough for us to be able to say that it is a discovery; and possibly a discovery," he said.

While many Higgs enthusiasts have taken to the Internet to offer theories on what might be announced, experts have dismissed the chatter as pure speculation.

Joe Lykken, a Fermilab theoretical physicist, said that physicists directly involved with the experiments do not even know yet, as they are only looking at analysis of the data over the weekend.

"We will be figuring out what is the right thing to say about it," he said.

Until then, Lykken would only say that physicists have more data than before, which should push them closer to knowing whether the Higgs is there or not.

"If you compare to what happened last December, we will have more details now because there is more than one way to look for Higgs boson," he said.

"If we are able to rule it out that would mean that the entire standard model has a fundamental flaw, and that for people like me -- I am a theoretical physicist, I am supposed to be able to explain things like that -- but that would be very difficult."

CERN director for research Sergio Bertolucci said last week that physicists have double the data they had last year.

"That should be enough to see whether the trends we were seeing in the

2011 data are still there, or whether they've gone away. It's a very exciting time," he said.

If physicists can confirm the existence of the Higgs boson, the announcement would rank among the most important breakthroughs of the last century.

The notion has many experts on the edge of their seats.

"We do not yet know what will be shown on July 4th," said a statement by Ian Hinchliffe, a theoretical physicist in the Physics Division at the US Department of Energy's Lawrence Berkeley National Laboratory.

"I have seen many conjectures on the blogs about what will be shown: these are idle speculation. Things are moving very fast this week," he added.

"Many years of hard work are coming to fruition."