

## Big Bang particle discovery closer: scientists

Robert Evans, Reuters, Geneva

(Reuters) - Physicists investigating the make-up of the universe are closing in on the Higgs boson, an elusive particle thought to have been key to turning debris from the Big Bang into stars, planets and finally life, scientists said on Tuesday.

Researchers at the European Organization for Nuclear Research (CERN) are using their large Hadron Collider (LHC), the world's biggest particle accelerator, to try to prove that the mystery particle really exists.

Poring over huge volumes of data, CERN physicists are confident they are now closer to achieving that aim, outside scientists with links to two key research teams at the Switzerland-based facility said.

"They are getting quite fired up," one scientist outside CERN but with links to the experiment who declined to be named told Reuters.

Strong signs of the Higgs were being seen in the same energy range where it was tentatively spotted last year, the scientists added, even though the particle is so short-lived that it can only be detected by the traces it leaves.

The quest for the obscure but scientifically crucial Higgs boson is being conducted by harnessing the LHC's high energy accelerator, which is located on the edge of Geneva, to replicate the Big Bang, the process scientists believe brought the known universe into being.

The Higgs is named after Briton Peter Higgs who in 1964 first came up with a detailed idea of what it might be and is the last major missing piece in the so-called Standard Model of how the universe works at the elementary particle level.

Its formal discovery, once it is endorsed by the world scientific community, would almost certainly ensure a Nobel prize for Higgs, now 83 and retired, and perhaps for at least one other European physicist and one American.

### SPECULATION

The scientists spoke of their CERN colleagues' progress after research chiefs at the Swiss facility decreed a cut-off last weekend in the processing of all data related to the search for the particle ahead of a major physics conference, ICHEP, in Melbourne in mid-July.

There has been widespread speculation that a major announcement on the Higgs, based on careful analysis of the most interesting of over 300 trillion proton collisions in the LHC so far this year, may be made at that gathering.

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But there was no confirmation from CERN itself that it was close to formally announcing it had discovered the particle and its linked energy field, thought to have given mass to matter and shape to the universe 13.7 billion years ago.

Researchers on the collider's separate ATLAS and CMS detectors have been "blinded" - or cut off from findings from the rival team and even from different groups inside their own.

CERN spokesman James Gillies said the centre would want to make any important announcement, once there was something to say, in Geneva.

"As for what ATLAS and CMS may or may not have in the 2012 data, that's only known to a few people in each experiment right now," he added.

"Blinding" is used in science to ensure that different groups working on identical experiments but with different if similar equipment do not influence the outcome of each other's research.

If they then come to the same conclusion, they can safely be seen to have independently validated each other's results, clearing the way to actually claiming a discovery.

In December 2011, after some 16 months of collisions at lower energy levels than this year, both teams joined at CERN to say they had separately seen "tantalizing glimpses" of the Higgs but needed more time to be sure if it was really there.

Data still coming in after last weekend's analysis cut-off will be processed later in the summer. Physicists say that more than half of the collisions produce nothing of scientific value and the record of their tracks are automatically dumped.

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