

# Physicists closing in on 'God particle' (Update)

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European Organization for Nuclear Research (CERN) scientists talk in the Alice experiment control room in 2010 near Geneva during an experiment in the Large Hadron Collider (LHC). Experiments at the world's biggest atom smasher have yielded tantalising hints that a long-sought sub-atomic particle truly exists, with final proof likely by late 2012, physicists said.

Experiments at the world's biggest atom smasher have yielded tantalising hints that a long-sought sub-atomic particle truly exists, with final proof likely by late 2012, physicists said Monday.

"We know everything about the Higgs boson except whether it exists," said Rolf Heuer, director general of the European Organisation for Nuclear Research (CERN).

"We can settle this Shakespearean question -- to be or not to be -- by the

end of next year," he told journalists at a webcast press conference at CERN headquarters in Geneva.

Researchers at the US Department of Energy's Fermilab, meanwhile, also reported telltale signs of the elusive particle, heating up a longstanding rivalry between the two high-energy physics laboratories.

CERN and Fermilab have both reduced the range of mass within which the "God particle," as it is known, might be found to a fairly narrow, low-mass band.

"The search for the Higgs boson is entering its most exciting, final stage," Stefan Soldner-Rembold, spokesman for one of Fermilab's two key experiments, said last week in a statement.

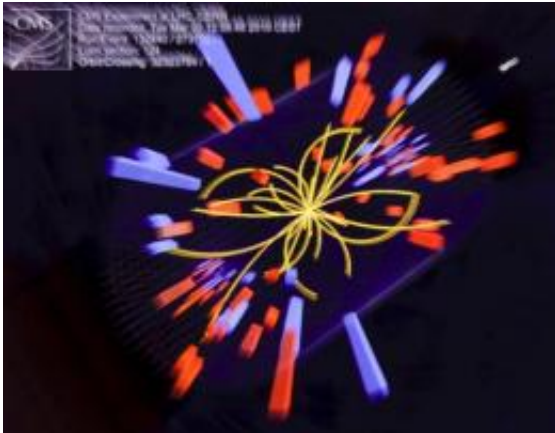
Higgs or no Higgs, the stakes are huge either way, and could easily earn a Nobel Prize for the scientists who can take credit for the breakthrough.

The long-postulated particle, first proposed in 1964, is the missing cornerstone of an otherwise well-tested theory, called the Standard Model, which explains how known sub-atomic elements in the universe interact.

Without the 'God particle', however, that whole edifice falls apart because the Standard Model fails to answer one fundamental question: why do most elementary particles have mass?

British theoretical physicist Peter Higgs proposed a mechanism that would "save" the theory -- if the particle named for him truly exists.

"If you find the Boson Higgs, the Standard Model is complete. If you don't find it, then the Model has a serious problem. Both outcomes are discoveries," Heuer said.



A monitor showing the first ultra high-energy collisions is seen at the CMS experiment control room of the European Organization for Nuclear Research (CERN) in 2010 near Geneva. Experiments at the world's biggest atom smasher have yielded tantalising hints that a long-sought sub-atomic particle truly exists, with final proof likely by late 2012, physicists said.

The Large Hadron Collider (LHC) -- a 27-kilometre (16.9-mile) ring-shaped tunnel 100 metres (325 feet) below ground straddling the French-Swiss border -- is on track to crack the puzzle within 18 months, he said.

"The LHC is working beyond my expectations, as are the experiments" which, he added, are "now ready to bring us into uncharted territory."

Scientists have increased the amount of collisions delivered to the experiments by a factor of 20 over the last year, he noted.

The complex is designed to accelerate sub-atomic particles in opposite directions at nearly the speed of light and then smash them together, creating collisions that briefly stoke temperatures 100,000 times hotter than the Sun.

Researchers search the fleeting, sub-atomic rubble for clues to unsolved mysteries about the origin and make-up of the universe.

"But don't expect too much too quickly," Heuer cautioned. "We are a factor of ten away from (the collision force) we hope to have at the end of next year. We are just in the middle," he said.

The announcements at CERN Monday received an unexpected challenge from George Smoot, an American astrophysicist who won the Nobel prize in 2006 for pioneering work on the Big Bang, which set the known Universe in motion 13.7 billion years ago.

"Here we have a situation where people locked into a model -- the Standard Model -- because it was a great solution way before there was any data," said Smoots, seated among the journalists at the press conference.

"I think we are actually seeing a discovery, but because we have been so narrow and brainwashed in our focus ... (theorists) have not really looked at the fact that there are new possibilities out there."

Jean Iliopoulos, winner in 2007 of the prestigious Dirac Medal for theoretical physics and mathematics shot back with a rejoinder.

"The role of the theorists is not only to run behind data, but to anticipate it," he said.

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