

# Higgs boson reality or chimera? Next year will show

Robert Evans, Reuters

The long-sought Higgs boson, believed to have given shape to the universe after the Big Bang, will be found in the next 12 months or shown to be a chimera, heads of the three top physics research centers said on Thursday.

And the three scientists -- from Europe's CERN, the U.S. Fermilab and Japan's KEK -- also pronounced themselves skeptics on whether neutrino particles had broken accepted natural laws and travelled faster than the speed of light.

"I think by this time next year I will be able to bring you either the Higgs boson or the message that it doesn't exist," declared Rolf Heuer, director general of CERN whose Large Hadron Collider (LHC) is at the focus of the search.

He was echoed by KEK's Atsuto Suzuki and Pier Oddone of Fermilab, which last weekend shut off after 26 years its Tevatron accelerator, which has also been seeking the Higgs in the debris of billions of particle collisions.

The three were speaking at a joint news conference after a three-day gathering of leading physicists at CERN to discuss what accelerators might eventually be added to the research arsenal, either to complement or replace the LHC.

Oddone said analysis of the data gathered in the Tevatron, which for nearly a decade led the search, would be under analysis for several more months but at best could only now reveal where the Higgs was not hiding.

Existence of the particle as the agent which gave mass to the chaos of flying matter after the explosion 13.7 billion years ago and made possible formation of galaxies, stars and planets, was postulated some four decades ago.

## STANDARD MODEL

Peter Higgs, the British physicist whose name it bears, and other scientists who came up with the theory in parallel, placed it firmly within the Standard Model of how the cosmos works at its fundamental particle level.

But if it, and nothing else that could have fulfilled its role, is not found, said Heuer, then the evolving model -- which has underpinned research since 1905 when Albert Einstein published his special theory of relativity -- would collapse.

However, all three said they were confident that the Higgs would be found in the LHC, which was started up in March 2010 and is creating multi-billions of mini-Big Bangs observed and analyzed by scientists around the globe.

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"Whatever happens, the Standard Model does not just fall off the table," said Oddone. If there were no Higgs, then another mechanism producing the same effect -- without which life would have been unthinkable -- had to be operating.

But Heuer, Oddone and Suzuki agreed that finding that mechanism would take much longer and would have to wait until the vast LHC which runs under the Swiss-French border near Geneva, has its power doubled in 2014.

Whatever it may be, it may not fit into Einstein's concept of the workings of the universe, said Oddone. "But then in some sense we have moved already beyond Einstein," he added.

However, the three did not see an immediate challenge to the scientist and his assertion that nothing could travel faster than light from an experiment which two weeks ago reported tracking super-luminal neutrino particles.

The finding, which the physicists involved said had so amazed them that they were asking for other researchers to check it, has caused a major stir among scientists around the world.

"On that, I am a skeptic," said Heuer, although the neutrinos involved in the experiment were pumped from CERN 730 kms to a laboratory in Grand Sasso in Italy. Oddone and Suzuki also voiced doubts.

Both KEK and Fermilab will be involved in duplicating the experiment. Oddone said that although he hoped to have a result in the next six months, it may take much longer.

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