'God Particle' Nobel ticks boson box for CERN

October 8 2013, by Jonathan Fowler

European Organisation for Nuclear Research (CERN) scientists celebrate with champagne after the annoucement of the winners of the Nobel Prize for Physics on October 8, 2013 in Meyrin near Geneva

The reflected glory of a Nobel prize for the minds behind the "God particle" sent champagne corks popping at Europe's top physics lab CERN Tuesday, vindicating its landmark discovery a year ago.

The Nobel Physics Prize for Britain's Peter Higgs and Belgium's

Francois Englert came 15 months after CERN announced it had flushed out what appeared to be the Higgs boson, a key building block of the Universe.

CERN, the European Organisation for Nuclear Research, put flesh on the bones of a four-decade-old theory in July 2012. A Nobel for the concept's founding fathers was the icing on the cake.

Pressed by reporters Tuesday on whether the Higgs boson was finally nailed down, CERN chief Rolf Heuer grinned, saying: "I think that the Nobel committee has just confirmed that!"

Minutes earlier, he and fellow CERN staff had cheered and opened champagne while watching the Nobel jury ceremony on a live-feed from Stockholm.

The subatomic boson was theorised in 1964 by Higgs and Englert, among others, in a drive to explain why some particles have mass and some, such as light, have none.

It is believed to act like a comb dipped in honey and held up in dusty air. Some dust slips through cleanly but most gets sticky—in other words, acquires mass. Mass brings gravity, pulling particles together.

CERN identified the Higgs boson thanks to its Large Hadron Collider (LHC), in a 27-kilometre (17-mile) circular lab under the Swiss-French border.

The LHC, which went offline earlier this year for a massive refit, smashed particles together to create snapshots of the Big Bang, the birth of the Universe 14 billion years ago.

CERN's teams are still crunching the vast array of data.

"Whether or not it is precisely the Higgs boson of the Standard Model, or something different, is something we are still studying and indeed will take many years to really understand as precisely as possible. But yes, we're pretty confident that this is a Higgs boson," said David Charlton of CERN's ATLAS research team.

The Standard Model is the chief theoretical framework of particle physics, conceived in the 1970s and folding in the ideas of Higgs, Englert and others.

Further work is needed to see exactly how the Higgs—or Higgses, if there are different forms—interacts with other particles.

Boson-hunting has been about a balance of proof, noted Joe Incandela of CERN's CMS research division.

"Proving a theorum mathematically takes an incredible amount of exactitude. We can't prove that this is a particular Higgs boson. So we call it a Higgs boson. But can we call it the Standard Model Higgs boson? We don't know if it is or not," Incandela told AFP.

"The reason we know it is a Higgs boson for sure is that there are things it does that no other particle can do. It has no spin, it couples strongly to certain particles and less so to others."

Its existence can only be inferred from its footprints.

"We find it by the way it decays, for instance into protons," said Incandela.

"In particle physics, it's one of the biggest discoveries ever. Technically, it was by far the hardest, but of course the next one will be harder," he added.

The LHC is due back online in 2015, ready to test theories considered as wild as the Higgs boson once was—such as invisible dark matter, thought to form most of the Universe.

"It's high time to go into the dark Universe," said Heuer. "To open that window would be great."

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