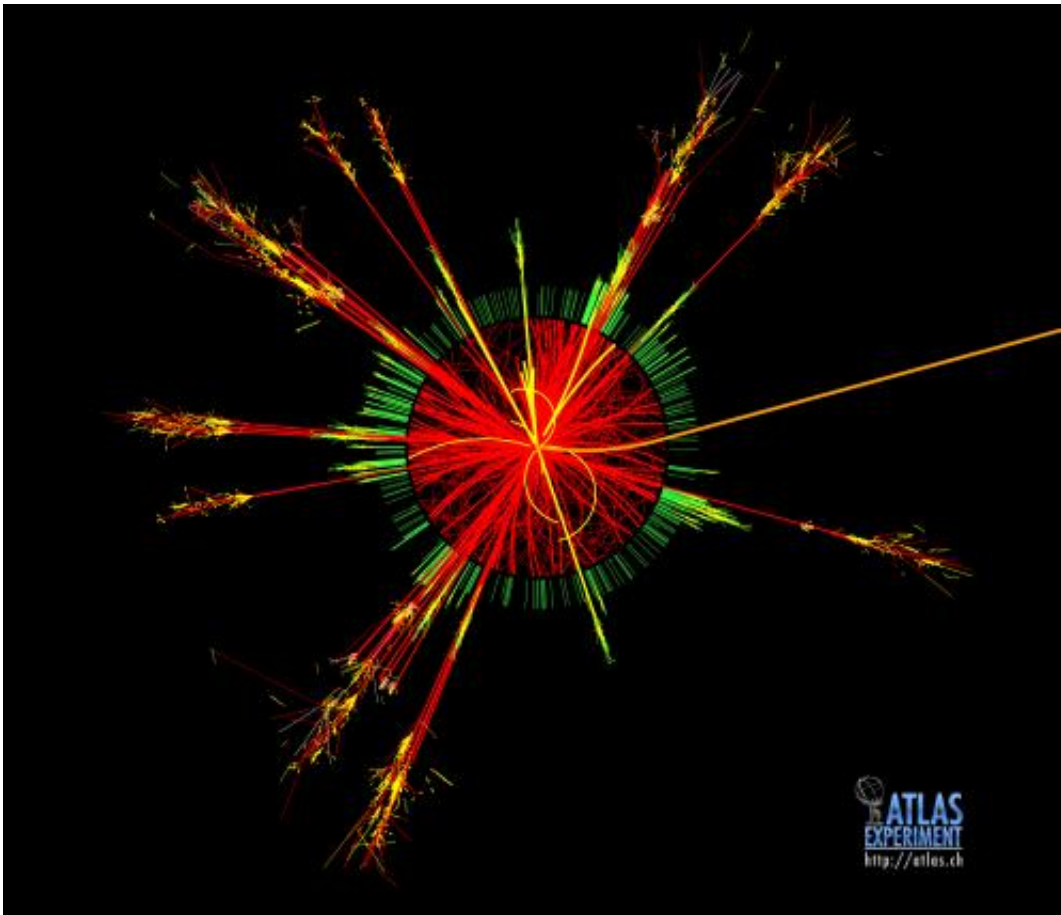


# CMS, ATLAS experiments report Higgs-like particle close to the 7 sigma level

December 17 2012, by Harriet Dingle

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(Phys.org)—The latest research findings from the Large Hadron Collider (LHC) at CERN show that the CMS and ATLAS experiments

are now reporting that the significance of their observation of the Higgs-like particle is standing close to the 7 sigma level, well beyond the 5 required for a discovery, and that the new particle's properties appear to be consistent with those of a Standard Model Higgs boson.

This news comes in a week when the [Physics World](#) award for their '2012 Breakthrough of the Year' gone to the ATLAS and CMS collaborations at CERN, for their joint discovery of a Higgs-like particle at the LHC.

The CMS and ATLAS results were delivered when representatives of the Large Hadron Collider (LHC) and five of its experiments presented a round-up report on the first three years of activity to the CERN Council.

The CMS and ATLAS representatives went on to report that further analysis of the data, and a probable combination of both experiments' data next year, will be required before some key properties of the new particle, such as its spin, can be determined conclusively. The focus of the analysis has now moved from discovery to measurement of the new particle in its individual decay channels.

The measurements reported by both experiments show that the new Higgs-like particle is in good health with a mass of around 125 GeV, but much further analysis is needed to reveal the full details of its identity. The next update is scheduled for the spring 2013 conferences, but for the final word before the LHC resumes running in 2015, we'll probably have to wait some time longer.

Other highlights from CERN included the [LHCb experiment](#) reporting on a measurement of one of the rarest processes so far observed in particle physics, the decay of a  $B_s$  (pronounced B-sub-s) meson into two muons. Measurements of rare decays provide important tests of the [Standard Model of particle physics](#), and are good places to look for [new](#)

[physics](#) beyond the Standard Model. The highlights from the ALICE experiment's first three years are detailed studies of the quark-gluon plasma, QGP, the matter of the primordial universe. Measurements from the TOTEM experiment give insights on the structure of the proton and provide input to the analyses of the other LHC experiments.

Provided by CERN

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