New Higgs results bring relief—and disappointment

Latest data from Large Hadron Collider reveals no hints of new physics.

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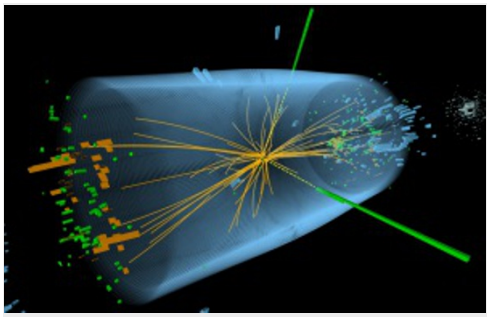

CMS/CERN

Higgs to two-photon candidate event as seen by CMS in May 2012.

This past July, physicists at the Large Hadron Collider announced that they had discovered a new particle that looked much like the long-sought-after Higgs boson. In fact, the Higgs-like particle they found was nearly perfect—based on the available data, it looked almost exactly like what the Standard Model of Particle Physics predicts the Higgs to look like. This finding gave physicists encouragement that they had finally bagged the elusive Higgs, but it fed the dread that the LHC won't come up with any shocking new observations to puzzle over. For if physicists don't find anything that conflicts with existing theories, how will we deepen our understanding?

This week physicists working at the LHC are sharing the first batch of Higgs data since that initial announcement. The LHC can't observe the Higgs directly, of course, since it quickly decays into other fundamental particles. Instead, physicists must count up the number of particles that detectors observe and tease out those that may have come from a momentarily existent Higgs. If the Standard Model is correct, physicists know how many of these daughter particles they should see. Any deviation from these expected numbers would indicate that something is happening beyond the Standard Model.

Alas, most of the Higgs results being presented this week at the Hadron Collider Physics symposium in Kyoto, Japan, have been well within our standard understanding. Physicists at ATLAS and CMS, the two largest particle detectors at the LHC, have about double the amount of data they did in July; this new data hasn't dramatically changed the tentative conclusion that the LHC is seeing a plain-old Standard Model Higgs.

To be sure, these are still early days, and with time and data physicists could learn that the Higgs differs from Standard Model predictions, or even that there's more than one Higgs to be found.

And that's also not to say the new results lack intrigue. In July, physicists found that the Higgs decays into two photons slightly more often than it was expected to. Could this have been a hint of new physics? Possibly. It could also just have been a statistical blip that would wash away in the coming flood of data. But while ATLAS and CMS physicists have this week updated their results for many other Higgs decays, on the question of photon decay they have chosen to remain silent. This week, the most tantalizing observation is the one that doesn't exist.

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