

## Is the Higgs boson an imposter?

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A group of Argonne National Laboratory researchers has suggested that last week's CERN data, fanfared to the world as the discovery of the elusive Higgs-Boson, might actually point to even more exotic creatures.

Their Arxiv-posted paper suggests that CERN's data could have identified either "a generic Higgs doublet" or a "triplet imposter". They do, however, borrow the Hitchhiker's Guide's "Don't Panic", noting that "a Standard Model Higgs boson gives a slightly better overall fit" with the current LHC data.

The analysis, conducted by Ian Low, Joseph Lykken and Gabe Shaughnessy, focuses not on the mass resonance revealed in the LHC data (125 GeV), but on the electroweak quantum numbers of the discovered particle. Their paper speculates that this analysis gives rise to different interpretations of the same data.

As noted by Technology Review, the prediction by Peter Higgs (and to be fair, other physicists working at the same time) merely stated that the boson now carrying his name should be massive, and would decay extremely quickly.

The combination of mass and extremely fast decay is what made the particle so hard to detect: it needs very high energy to come into existence, and can only be spotted by analyzing the particles it decays into (W and Z bosons, or photon pairs, for example).

The Argonne researchers note that the resonance LHC has identified at 125 GeV has a good fit with the Standard Model Higgs boson – but also matches the resonance predicted in more exotic theories (the doublet or triplet imposter). These theories posit that there isn't just one Higgs boson, but a family of particles which together give rise to the Higgs field that bestows mass on W and Z bosons.

It's even feasible, they write, that the Higgs boson data could reveal an imposter particle breaking electroweak symmetry in a "warped extra dimension", although this is strongly disfavoured by the LHC data.

It's only a few days since some writers were proclaiming the "end of physics". Perhaps the end is in sight – but only after researchers finish the long job of identifying exactly what the LHC (and the Tevatron) found, and characterizing all the properties of the Higgs particle/s.