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Discovery of a Higgs-like resonance and implications for what's next

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The recent discovery of a Higgs-like resonance at ~ 125 GeV by the Atlas and CMS collaborations– with corroborating evidence from CDF and D0 at Fermilab Tevatron– is an outstanding achievement and suggests the completion of the Standard Model. The 125 GeV mass value also falls in the narrow window predicted by models of weak scale supersymmetry (SUSY), although so far there is no sign of SUSY. At first sight, the new LHC mass limits on SUSY particles seem in discord with the measured value of M_Z , exacerbating what is known as the “little hierarchy problem”: how can such large values of SUSY model parameters conspire to yield a Z boson mass of just 91.2 GeV? A new paradigm model of SUSY is emerging, known as natural SUSY, which may be difficult to detect at LHC, but which gives rise to new matter states– light higgsinos– which ought to be detectable at a linear e^+e^- collider operating at $0.3 - 1$ TeV. Such a scenario also requires revision of expectations for dark matter: in natural SUSY, one might expect both an axion and a higgsino-like WIMP to appear.