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Theory perspective (other than SUSY)¹

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The particle discovered in 2012 at the Large Hadron Collider (LHC) has properties very similar to that of the Standard Model (SM) Higgs boson. Therefore, the picture of electroweak symmetry breaking may turn out to be close to the minimal one described in the SM. However, deviations from that minimal scenario could arise. One reason to expect such deviations is the question of hierarchy: without new interactions near the weak scale, there is no obvious reason why quantum corrections would not push the Higgs mass far above the observed value of about 125 GeV. At a more empirical level, cosmic Dark Matter, which cannot be explained in the SM, can also motivate the search for new weak scale physics. Over the years, various non-supersymmetric possibilities, such as non-trivial dynamics or extra dimensions, have been proposed to address the hierarchy and DM puzzles. In this talk, we review some of these proposals and discuss their phenomenological status and future prospects, after the first run of the LHC.

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