

Abstract Submitted
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Solving the Little Hierarchy Problem with a U(1) Extension of the MSSM¹ RODOLFO CAPDEVILLA, ANTONIO DELGADO, ADAM MARTIN, Univ of Notre Dame — In the Minimal Supersymmetric Standard Model (MSSM) the Higgs mass is not a free parameter, but it is given in terms of the gauge couplings. In a reasonable limit, the tree-level mass is of the order of the Z boson mass, in clear contradiction with the experimental results. This value can be lifted by loop corrections via heavy virtual sparticles, where the largest contribution comes from stops. However, the so-called Electroweak fine-tuning also depend quadratically on the stop masses, which means that if the stops have to be very heavy in order to reproduce the Higgs mass, a "little" fine-tuning is re-introduced in the theory. One way to avoid this fine-tuning is to modify the tree-level quartic of the Higgs boson via new F or D term contributions, so that one does not have to rely on large loop corrections to obtain a viable Higgs mass. In this work we study a minimal U(1) extension to the MSSM. We study the stops sector of the model and we find that the correct Higgs mass is compatible with light stops around 700 - 800 GeV and a Z' resonance close to the 2.5 TeV bound from the run-I of the LHC, or with a little heavier stops 800 - 900 GeV if the Z' resonance is near 3.1 TeV. This region of parameter space will be quickly accessible at run-II of the LHC.

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