

SUSY Higgs Mass and Collider Signals with a Hidden Valley

Thursday 1 October 2015 15:00 (15 minutes)

We propose a framework of supersymmetric standard models that can ameliorate both the SUSY Higgs mass problem and the missing superpartner problem. New vectorlike matter fields couple to the Higgs and provide new loop contributions to its mass. To avoid a Landau pole for new Yukawa couplings, these fields are charged under a new gauge group, which confines and leads to a Hidden Valley-like phenomenology. The Hidden Valley sector is almost supersymmetric and ordinary sparticles decay to exotic new states which decay back to standard model particles and gravitinos with reduced missing energy. We find a viable parameter space of specific benchmark models which ameliorates both of the major phenomenological problems with supersymmetry. Predictions for upcoming LHC searches are also presented.

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Session Classification: Particle Phenomenology