

LSS Signals from Solutions to the Higgs or Neutrino Hierarchy Problems

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Cosmology offers a unique opportunity to explore new physics with tiny interactions to the Standard Model particles. This is particularly useful for studying new physics scenarios that address hierarchy problems while evading collider detections. I will briefly review three examples where data from the Large Scale Structure is crucial for identifying signals of solutions to hierarchical problems, and explain why the high-redshift measurements of the matter spectrum may be the only way to examine these models. The examples include: (1) the Mirror Twin Higgs model, which addresses the little Higgs hierarchy problem from a well-defined atomic dark matter sector causing Dark Acoustic Oscillation signals in the matter power spectrum. (2) The N-naturalness model, which resolves the Higgs hierarchy problem and predicts a tower of warm dark matter particles creating a distinct signal of suppression in the matter power spectrum. (3) The Majoron scenario, which explains the hierarchical mass spectrum of neutrinos compared to other fermions, and can lead to neutrino decays occurring on a cosmological time scale. The scenario results in a different redshift dependence in the evolution of matter power spectrum.

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