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Vacuum stability in dynamical seesaw model

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The Standard Model (SM) vacuum is unstable for the measured values of the top Yukawa coupling and Higgs mass. We study the issue of vacuum stability when neutrino masses are generated through spontaneous low-scale lepton number violation. In the simplest dynamical inverse seesaw, the SM Higgs has two siblings: a massive CP -even scalar plus a massless Nambu-Goldstone boson, called majoron. For TeV scale breaking of lepton number, Higgs bosons can have a sizeable decay into the invisible majorons. We examine the interplay and complementarity of vacuum stability and perturbativity restrictions, with collider constraints on visible and invisible Higgs boson decay channels. This simple framework may help guiding further studies, for example, at the proposed FCC facility.

Summary

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