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Cosmological Signatures of Neutrino Seesaw Mechanism

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The tiny neutrino masses are most naturally explained by the seesaw mechanism through singlet right-handed neutrinos, which can further explain the matter-antimatter asymmetry in the universe. In this work, we propose a new approach to study cosmological signatures of neutrino seesaw through the interaction between inflaton and right-handed neutrinos. After inflation the inflaton predominantly decays into right-handed neutrinos and its decay rate is modulated by the fluctuations of Higgs field which act as the source of curvature perturbations. We demonstrate that this modulation produces primordial non-Gaussian signatures, which can be measured by the forthcoming large-scale structure surveys. We find that these surveys have the potential to probe a large portion of the neutrino seesaw parameter space, opening up a new window for testing the high scale seesaw mechanism.

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