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Large Scale Structure Signals of Neutrino Decay

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Although it has been a half century since the discovery of standard model neutrinos, there is still no concrete evidence of the sum of their masses and lifetimes. If neutrinos decay at cosmological time scales, we demonstrate that precision cosmological data from large scale structure (LSS) and CMB lensing measurements can probe both neutrino lifetime and the sum of masses. In this talk, I will point out that (i) allowing neutrinos decay will relax the current bound on neutrino mass from cosmological data and (ii) near future measurements (e.g. Euclid) are sufficient to break the degeneracy between neutrino masses and their lifetimes. We set a 2D limit on the sum of neutrino masses and lifetime using current LSS and CMB data. Such limit is orders of magnitude stronger than all other current limits on non-radiative neutrino decay width.

Summary

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