

University of Notre Dame
College of Science
Department of Physics

SPECIAL ASTROPHYSICS SEMINAR

Neutrino Mass Bounds from Neutrinoless Double Beta Decays and Cosmological Probes

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We investigate how the total mass sum of neutrinos can be constrained from the neutrinoless double beta decays and cosmological probes with cosmic microwave background (WMAP 5-year results), large scale structure (including 2dFGRS) and SDSS data sets. First we discuss, in brief, the current status of neutrino mass bounds from neutrino beta decays and cosmic constraints within the flat LCDM model.

In addition, we explore the interacting neutrino dark-energy model, where the evolution of neutrino masses is determined by a quintessence scalar field, the so called "Mass-Varying Neutrinos beyond the Standard Cosmology Model", which is responsible for cosmic acceleration today. Assuming the flatness of the universe, the constraint we can derive from the current observation is $M_{\nu} < 0.87$ eV at the 95% confidence level, which is consistent but weaker bound than $M_{\nu} < 0.68$ eV in the flat LCDM model. We also discuss more stringent bounds with Ly-alpha Forest data.

NOTE: SPECIAL DAY AND TIME