

The sterile neutrino: a combined view of cosmological limits with oscillation searches

Thursday 27 July 2017 16:45 (15 minutes)

A light sterile neutrino that mixes with the active states has been proposed to explain anomalies in short baseline neutrino oscillation data. Constraints on the mass and mixing parameters are usually presented by showing results from complementary neutrino oscillation experiments. However, measurements of the Cosmic Microwave Background, most recently by the Planck satellite, constrain the radiative degrees of freedom in the early universe, which would be affected by a sterile neutrino. We have for the first time translated these Planck constraints into the parameter space of neutrino oscillation, that of mixing angles and mass splittings. We will show these constraints from Planck compared to the muon-neutrino disappearance oscillation limits on sterile neutrinos from MINOS and IceCube, and also compare them with the recent electron-neutrino disappearance limits from reactor experiments such as Daya Bay and NEOS. Finally we will present new results of the cosmological limits in the context of muon-to-electron-neutrino appearance searches.

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Session Classification: Neutrino Parallel

Track Classification: Neutrinos