

Nature of neutrino mass, refraction and cosmology

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A possibility is considered that the observed neutrino oscillations are due to refraction effects on a very light scalar dark matter. Properties of the effective neutrino mass-squared responsible for the oscillation effects are studied. In particular, the dependence of the effective mass on state of medium: a cold gas of particles or a classical scalar field is explored. Cosmological consequences of such a scenario are considered. It is shown that the cosmological bound on sum of neutrino masses can be avoided in the case of refraction on the bath of particles.

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