Contribution ID : **824** Type : **Oral presentation**

νΛMDM: A Model for Sterile Neutrino and Dark Matter Reconciles Cosmological and Neutrino Oscillation Data after BICEP2

Thursday, 3 July 2014 11:42 (18)

We propose a ultraviolet complete theory for cold dark matter(CDM) and sterile neutrino that can accommodate both cosmological data and neutrino oscillation experiments at 1σ level. A new U(1)X dark gauge symmetry is introduced, and is assumed to be broken at ~⊠(MeV) scale. Such a light mediator for DM's self-scattering and scattering-off sterile neutrinos can resolve three controversies for cold DM on small cosmological scales, cusp vs. core, too-big-to-fail and missing satellites problems. We can also accommodate ~ eV scale sterile neutrinos as the hot dark matter(HDM) and can fit some neutrino anomalies from neutrino oscillation experiments within 1σ. Finally the right amount of HDM can make a sizable contribution to dark radiation, and also helps to reconcile the tension between the data on the tensor-to-scalar ratio reported by Planck and BICEP2 Collaborations.

Summary

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Session Classification : Astroparticle Physics and Cosmology

Track Classification : Astroparticle Physics and Cosmology