Contribution ID: **12** Type: **not specified**

Non-Thermal Dark Matter Mimicking An Additional Neutrino Species In The Early Universe

Thursday, 14 June 2012 15:00 (15 minutes)

The South Pole Telescope (SPT), Atacama Cosmology Telescope (ACT), and Wilkinson Microwave Anisotropy Probe (WMAP) have each reported measurements of the cosmic microwave background's (CMB) angular power spectrum which favor the existence of roughly one additional neutrino species, in addition to the three contained in the standard model of particle physics. Neutrinos influence the CMB by contributing to the radiation density, which alters the expansion rate of the universe during the epoch leading up to recombination. In this paper, we consider an alternative possibility that the excess kinetic energy implied by these measurements was possessed by dark matter particles that were produced through a nonthermal mechanism, such as late-time decays. In particular, we find that if a small fraction (~ 1%) of the dark matter in the universe today were produced through the decays of a heavy and relatively longlived state, the expansion history of the universe can be indistinguishable from that predicted in the standard cosmological model with an additional neutrino. Furthermore, if these decays take place after the completion of big bang nucleosynthesis, this scenario can avoid tension with the value of three neutrino species preferred by measurements of the light element abundances.

Primary author: QUEIROZ, Farinaldo (Fermilab & UFPB)

Presenter: QUEIROZ, Farinaldo (Fermilab & UFPB)

Session Classification: Final Session