Abstract Submitted
for the APR16 Meeting of
The American Physical Society

Exploring a Non-Minimal Sterile Neutrino Model at IceCube
ZANDER MOSS, CARLOS ARGUELLES, MIT — In a recent analysis of atmospheric muon neutrino disappearance, IceCube placed strong bounds on active-sterile neutrino mixing thus increasing the tension between disappearance measurements and the various signal excesses seen in short baseline and reactor neutrino experiments. The growing tension from terrestrial experiments and also from cosmology invites us to move from the minimal sterile neutrino model to one where the sterile neutrino has new interactions and additional particles can be considered. In particular, we will discuss a model of neutrino decay in which active and sterile neutrinos decay into light particle states. This decay will modify the neutrino disappearance oscillation probabilities. These modifications may alleviate the tension. Since the parameter space under consideration is large, we will study it in two ways. First, we assume an anarchic decay structure, sampling uniformly on the SU(N) flavor structure group. Second, we will perform an MCMC analysis using one year of IceCube data. By comparing the signals from anarchic sampling to the IceCube data and an MCMC analysis thereof, we draw conclusions about both the viability of the model and the likelihood that a random draw from the structure group could have produced the observed behavior.

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Date submitted: 08 Jan 2016 Electronic form version 1.4