Contribution ID: **658** Type: **not specified**

An Improved Search for Unstable Sterile Neutrinos at IceCube

Wednesday 15 May 2024 16:45 (15 minutes)

The existence of sterile neutrinos can lead to a matter-enhanced resonance that results in a unique disappearance signature for Earth-crossing neutrinos, providing an alternative method for probing the short baseline anomalies. In order to reconcile the tension between appearance and disappearance experiments, decay mechanisms for the heavy sterile mass state have been proposed. In this talk, I will present the results of an improved search for eV-scale unstable sterile neutrinos with a high purity sample of up-going muon neutrinos from 500 GeV to 100 TeV using eleven years of data from the IceCube Neutrino Observatory. This work utilizes an updated event selection compared to previous results, with major improvements to reconstructions, systematic uncertainties, and the inclusion of a DNN-based classifier to separate starting and through-going events. The implications of these results in the context of the global fits will also be discussed.

Mini Symposia (Invited Talks Only)

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Session Classification: Neutrino Physics

Track Classification: Neutrino Physics