

Sensitivity to Secret Neutrino Interaction at Tau Neutrino Experiments

Monday, 12 June 2023 14:20 (20 minutes)

I will discuss the potential of future tau neutrino experiments, including the Liquid Argon detector DUNE atmospheric data, the Forward Liquid Argon Experiment (FLArE100) detector at the Forward Physics Facility (FPF), and emulsion detector experiments such as SND@LHC, FASER ν 2, and SND@SHiP, to search for a hidden interaction between neutrinos mediated by a new light sub-GeV gauge boson, Z' , and the coupling $g_{\alpha\beta}$. I will explain how these experiments have the capability to significantly enhance the current constraints on $g_{\alpha\beta}$ for the $1 \text{ MeV} < M_{Z'} < 500 \text{ MeV}$ mass range, as well as for $M_{Z'} < \text{few keV}$, due to their high energy and ability to detect τ neutrinos.

I will discuss the crucial role of DUNE atmospheric data in the search for hidden neutrino interactions because of its excellent detection capabilities for tau neutrinos. Specifically, I will represent that DUNE atmospheric data can set the most stringent constraint on $g_{\alpha\beta}$ and improve the current constraint by two orders of magnitude.

Secondary category for the parallel session (optional)

Neutrino Physics

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