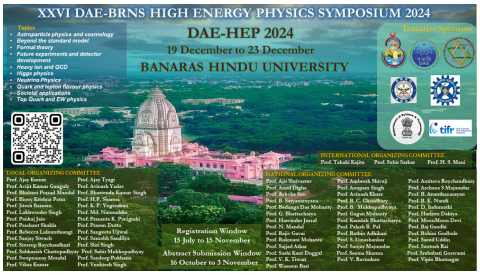

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Probing Neutrino Mass through Scalar NSI in Neutrino Oscillation Experiment

In the standard interaction framework, neutrino oscillations are sensitive only to mass-squared differences, making it challenging to directly measure absolute neutrino masses via neutrino oscillation experiments. However, scalar non-standard interactions (SNSI) can introduce sub-dominant terms in the neutrino oscillation Hamiltonian that directly influence the neutrino mass matrix, offering a unique method for probing absolute neutrino masses [1–4]. In this study, we present the constraints on absolute neutrino masses by probing SNSI. We investigate the constraints on the lightest neutrino mass for various values of δCP and θ23 with both normal and inverted neutrino mass hierarchies. Our results indicate that, in the presence of SNSI at DUNE [5], a bound on the neutrino mass can be established, particularly with the parameter $\eta\tau$ τ in normal hierarchy, independent of the octant of θ23 and the CP phase δCP . This work highlights SNSI as a promising avenue for constraining absolute neutrino masses through long-baseline neutrino oscillation experiments [6].

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Field of contribution

Phenomenology

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