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## Evolution of Mass-Mixing Parameters in Matter with Neutrino NSIs

We explore the role of matter effect in the evolution of neutrino oscillation parameters in the presence of all possible lepton-flavour-conserving and lepton-flavour-violating non-standard interactions (NSIs) of the neutrino. We derive simple approximate analytical expressions for the mass-mixing parameters in matter in presence of NSIs. We observe that only the NSIs in 2-3 block ( $\varepsilon_{\mu\mu}$ ,  $\varepsilon_{\tau\tau}$ , and  $\varepsilon_{\mu\tau}$ ) affect the running of  $\theta_{23}$ . Though all the NSIs influence the evolution of  $\theta_{13}$ , but,  $\varepsilon_{e\mu}$  and  $\varepsilon_{e\tau}$  have prominent impact at the energies relevant for DUNE. We demonstrate the utility of our approach in addressing several important features related to neutrino oscillation such as: a) estimating the resonance energy in presence of NSIs when  $\theta_{13}$  in matter becomes maximal, b) figuring out the required baseline length and neutrino energies to have maximal matter effect in  $\nu_{\mu}$  to  $\nu_e$  transition, and c) unraveling interesting degeneracies between  $\theta_{23}$  and NSI parameters.

### Mini-abstract

Analytical expressions for running of oscillation parameters in matter with NSIs & their utilities

### Experiment/Collaboration

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