Contribution ID: **187** Type: **Parallel talk**

Probing Scalar Nonstandard Interactions: Insights from the Protvino to Super-ORCA Experiment

Tuesday 15 October 2024 14:15 (15 minutes)

We have investigated the non-standard interaction mediated by a scalar field at the upcoming long-baseline neutrino experiments, Protvino to Super-ORCA (P2SO) and Deep Underground Neutrino Experiment (DUNE). Specifically, we have studied the sensitivity of these two experiments to constrain the diagonal Scalar Non-standard interaction (SNSI) parameters η_{ee}, $\eta_{\mu\mu}$ and $\eta_{\tau\tau}$ and how the measurements of mass hierarchy, octant of θ_{23} and CP violation (CPV) sensitivity is affected in the presence of SNSI. Our key finding is that Δm^2_{31} has a very non-trivial behavior in the presence of $\eta_{\mu\mu}$ and $\eta_{\tau\tau}$ when we consider SNSI does not exist in nature. Both the experiments are very sensitive to these SNSI parameters, but for η_{ee}, DUNE provides a stringent bound compared to P2SO. Mass hierarchy and CPV sensitivity are affected mainly by η_{ee} compared to the other two parameters. In contrast, octant sensitivity is mainly affected by $\eta_{\mu\mu}$ and $\eta_{\tau\tau}$ if we consider, SNSI to exist in nature. The sensitivity of the measurements is either higher or lower than that of the standard case, depending on the relative sign of these parameters.

Track type

Neutrino Physics

Author: SINGHA, Dinesh Kumar

Co-authors: PANDA, Lipsarani; GHOSH, Monojit; MAJHI, Rudra; MOHANTA, Rukmani

Presenter: SINGHA, Dinesh Kumar

Session Classification: Parallel - Neutrino