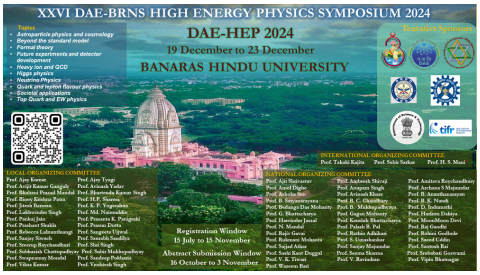


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# Exploring New Physics with scalar NSI at the DUNE and P2SO experiments

In today's precise age of neutrino physics, non-standard interactions (NSI) and other subdominant new physics scenarios are highly intriguing for delving into physics beyond the standard model (BSM). The study of scalar NSI (SNSI), which is mediated by a scalar field, has been an intriguing topic of interest in the recent years. In contrast to vector NSI, SNSI alters the standard neutrino mass matrix via Yukawa couplings and presents itself as an extra mass matrix with real and complex components. We explore the impact of off-diagonal SNSI parameters, distinguished by their magnitudes $\eta_{\alpha\beta}$ and unique phases $\phi_{\alpha\beta}$ . We have examined two upcoming LBL experiments, DUNE and P2SO, in order to constrain these these SNSI parameters. We also examined how they impact the measurement of standard oscillation parameters. We subsequently found that the new CP phases ($\phi_{\alpha\beta}$) can greatly affect the the unknowns in the neutrino sector. We found that the oscillation parameter $\Delta m^2_{31}$ exhibits non-trivial behaviour in presence of SNSI. We observed that $\phi_{\mu\tau}$ has significant effects on determining the several oscillation parameters.

## Field of contribution

Phenomenology

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