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Neutrino-dark matter interactions and CP-phase measurement at DUNE

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The non-standard interaction (NSI) of neutrinos mediated by a scalar particle is an interesting new physics scenario to explore in oscillation experiments. The scalar NSI contribution appears as a perturbation to the mass term in the neutrino Hamiltonian, giving a unique possibility of probing absolute neutrino mass through oscillations. The linear scaling of scalar NSI with matter density makes long-baseline experiments an excellent tool for exploring scalar NSI. We present compact analytical expressions of neutrino oscillation probabilities in the presence of diagonal elements of the scalar NSI matrix. The expressions will facilitate our understanding of various trends and patterns observed in the oscillation probabilities due to the presence of scalar NSI.

Working Group

WG 5: Neutrinos Beyond PMNS

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