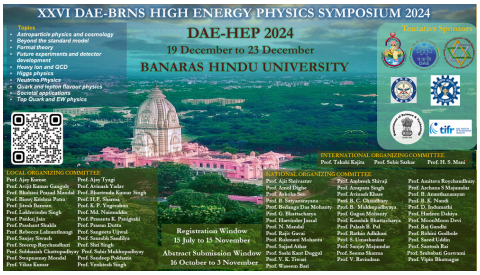

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Effect of scalar NSI on neutrino oscillations: An Analytic Approach

Scalar non-standard interaction (SNSI) is the interaction of neutrinos with standard model fermions mediated by a scalar particle. SNSI is an interesting beyond the Standard Model (BSM) scenario as it appears to be a density-dependent perturbation to neutrino mass, introducing absolute mass dependence to neutrino oscillations. In this work, we present compact analytic expressions for neutrino oscillation probabilities in the presence of diagonal SNSI elements. The expressions obtained have explicit matter dependence and they enable us to bring out absolute mass dependence through terms having the form $m_1 + m_2$, $m_2 - m_1$, $m_1 c_{12}^2 + m_2 s_{12}^2$, $m_1 s_{12}^2 + m_2 c_{12}^2$ and m_3. These terms behave differently in different mass ordering scenarios and consequently, changing the mass ordering changes the SNSI contribution non-trivially. Our analytic approximations are applicable for all scenarios where constant density approximation holds and can be used for upcoming experiments like DUNE, T2HK, and T2HKK.

Field of contribution

Phenomenology

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