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Implication of nonunitary mixing matrix in the scenario of dark NSI

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In standard model (SM) of particle physics neutrinos are massless because of the absence of its right handed counterpart. In several extensions of SM, due to the inclusion of the right handed neutrino, the neutrino flavour mixing matrix becomes nonunitary (arXiv:1503.08879 [hep-ph]). Another way to incorporate the NP beyond SM is the consideration of non standard interaction (NSI) which can be mediated via both vector and scalar bosons. Vector NSI directly affects the matter potential in neutrino oscillation ([arXiv:1907.00991 [hep-ph]]), while the scalar NSI contributes correction term to the neutrino mass matrix ([arXiv:1812.08376 [hep-ph]]). Due to large abundance of dark matter (DM) particles in the universe, it is possible for the scalar mediator to be a potential DM candidate, generating dark NSI. In this work the effect of non-unitary mixing matrix is analysed on the neutrino flavour oscillation probability in presence of dark NSI, considering the cases of both normal and inverted mass hierarchy in context of long baseline experimental setup.

Session

Neutrino Physics

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