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Sterile sector impacting the correlations and degeneracies among mixing parameters at DUNE and the role of high energy beams

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The Deep Underground Neutrino Experiment (DUNE) is a leading experiment in neutrino physics which is presently under construction. DUNE aims to measure the yet unknown parameters in the three flavor oscillation scenario which includes discovery of leptonic CP violation, determination of the mass hierarchy and determination of the octant of θ_{23} . Additionally, the ancillary goals of DUNE include probing the subdominant effects induced by new physics. A widely studied new physics scenario is that of additional sterile neutrinos. We consider some of the essential sterile parameters impacting the oscillation signals at DUNE and explore the space of sterile parameters as well as study their correlations among themselves and with the yet unknown CP violating phase, δ appearing in the standard paradigm. The experiment utilizes a wide band beam and provides us with a unique opportunity to utilize different beam tunes at DUNE. We demonstrate that combining information from different beam tunes (low energy and medium energy) available at DUNE impacts the ability to probe some of these parameters and leads to altering the allowed regions in two-dimensional space of parameters considered.

Session

Beyond the Standard Model

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