

Theoretical Physics Seminars

Effect of non-standard neutrino interactions on the sensitivities of DUNE

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From: Physical Research Laboratory, Ahmedabad

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Place: Room No. 469

Deep Underground Neutrino Experiment (DUNE) is a potential long-baseline neutrino oscillation experiment of the next generation. It can act as a promising probe to new physics scenarios like non-standard neutrino interactions (NSI), which is a subleading phenomenon to the well established neutrino oscillations. In this work, we consider the effect of non-standard interactions (NSIs) on the propagation of neutrinos through matter and how they in turn affect the sensitivity of the DUNE in determining the mass hierarchy. We emphasize on the special case - when the diagonal NSI parameter $\epsilon_{ee} = -1$ at which the standard matter effect gets nullified. We show that, if in addition, there is maximal CP violation then this gives rise to an exact intrinsic hierarchy degeneracy, in the appearance channel, irrespective of the baseline and energy. Considering current model independent bounds on NSI parameters we observe that the hierarchy sensitivity of DUNE gets seriously compromised if NSI exists in nature. A signal of neutrino mass hierarchy at DUNE will therefore be able to rule out certain ranges of the NSI parameters. Additionally, we discuss the implications of $\epsilon_{ee} = -1$ (in the Earth) on MSW effect in the Sun.

All are welcome