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DUNE sensitivity for observing/discriminating theories beyond standard neutrino oscillation

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Effects beyond-standard oscillation (BSO) are being studied as they can modify the framework of the standard oscillation due to second-order contributions. In this work, we investigate the sensitivity of the DUNE experiment to observe such BSO effects as we increase their intensity, for which we include different BSO hypotheses. The BSO hypotheses considered in this work are: neutrino decay (invisible and visible), non-standard interactions, violation of the equivalence principle, and quantum decoherence. We systematically evaluate DUNE's ability to distinguish between different BSO hypotheses, assigning one of them as the true signal and another as the test signal. The CP-violating phase parameter, δ_{CP} , may have potential distortions with respect to the measured value using an incorrect BSM hypothesis. Even when the BSO scenarios are almost indistinguishable from each other, the measured value of δ_{CP} can be very different from the value used in the theoretical hypothesis.

Submitted on behalf of a Collaboration?

No

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