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LIV Studies for Inverted Hierarchy Scenario

The Standard Model is highly successful in describing the behavior of particles and the nongravitational forces that govern their interactions. However, its limitations hinder our ability to explain certain phenomena, like the observed matter-antimatter asymmetry. Such limitations led to the development of extensions to the Standard Model. Unified theories, such as string theory and loop quantum gravity, suggest that Lorentz Invariance Violation may occur at the Planck Scale, but direct measurements at this scale are currently impossible. Nevertheless, this violation could be observable at a lower energy scale accessible to current experiments under the Standard Model Extension (SME) framework. Long-baseline experiments with neutrinos are crucial in advancing our understanding of physics beyond the Standard Model. Nevertheless, such studies mainly concern the normal hierarchy of neutrino masses. In this study, we investigate the influence of LIV parameters on the inverted hierarchy scenario. We present the probabilities, event rates, and sensitivity studies for long-baseline neutrino experiments.

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