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Investigating the New Physics scenario in P2O Experiment

One of the basic propositions of quantum field theory is Lorentz invariance. In some string theory models Lorentz symmetry may break spontaneously at a very high energy scale (Planck scale). In a low energy effective field theory, such as in the Standard Model Extension (SME) of particle physics, one can observe such Lorentz Invariance Violation (LIV) in a perturbative way. The present and future Long-baseline neutrino experiments can give a scope to observe such Planck suppressed physics through their long distance neutrino propagation. Due to large fiducial mass of the water Cerenkov detector at ORCA, P2O is expected to provide competitive sensitivity to LIV, even with a moderate beam power and runtime. In this work we aim to probe the sensitivity of P2O experiment to LIV and combine it with the currently available data from T2K and NOvA and simulated data from DUNE, to improve the bounds on LIV parameters.

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