

Breaking of CPT due to quantum decoherence tested at DUNE

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We study the feasibility of observing deviations from the CPT symmetry owing to quantum decoherence and in the framework of the neutrino oscillations. Taking into account the open system approach, and considering non-diagonal decoherence matrices, we study all the cases in which CPT violation (CPTV) terms that could be arising in the neutrino oscillation probabilities. Moreover, and based on the information from the muon neutrino/antineutrino channels, we put on trial all the CPTV cases using the DUNE experiment. For the optimal case, we find 5σ of confidence for $\Gamma(E/\text{GeV})^n \sim 13.1 \times 10^{-23}\text{GeV}$, $4.6 \times 10^{-23}\text{GeV}$ $2.1 \times 10^{-23}\text{GeV}$ y $0.8 \times 10^{-23}\text{GeV}$ for $n = -1, 0, 1$ and 2 respectively.

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