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Investigating New Physics Signatures with High-Energy Neutrino Events at NOvA

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The NuMI Off-Axis ν_e Appearance (NOvA) experiment is a long-baseline neutrino oscillation experiment primarily designed to study ν_e , $\bar{\nu}_e$ appearance as well as ν_μ and $\bar{\nu}_\mu$ disappearance in the energy range of $1 < E\nu < 4$ GeV. Interestingly, the NOvA far detector also records a non-negligible number of high-energy ν_e and $\bar{\nu}_e$ events in the extended range of $4 < E\nu < 20$ GeV. These events, although sub-dominant in standard oscillation analyses, open a window to probe physics beyond the Standard Model.

In this work, we explore the potential of NOvA to constrain new physics scenarios specifically, non-standard neutrino interactions (NSIs) and environmental decoherence, using the high-energy event spectrum observed at the far detector.

Secondary track

T03 - Neutrino Physics

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