

Potential for 3+1 and Lorentz violation measurements with DUNE

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This talk presents phenomenology related to the observation of high energy atmospheric neutrinos in the Deep Underground Neutrino Experiment (DUNE). DUNE is a next-generation long-baseline neutrino oscillation experiment designed to perform precision measurements of the neutrino parameters and study neutrino interactions. This program includes the construction of four 17 kT Far Detector (FD) liquid argon (LAr) time projections chambers (TPC). The large instrumented mass of the FD and unprecedented detail of LAr TPCs provide a unique opportunity to explore atmospheric neutrinos in a largely untouched energy regime. Between 50 GeV and 1 TeV, the DUNE FD will measure the spectrum and arrival distribution of atmospheric muon-neutrinos interacting in nearby bedrock and within the detector. Other neutrino experiments have limited energy resolution in this regime, presenting a unique opportunity for DUNE. This energy regime is relevant for constraining beyond Standard Model (BSM) scenarios like 3+1 sterile neutrino models and Lorentz violating effects. We present the potential for new contributions from DUNE with atmospheric neutrino measurements and sensitivity to these BSM scenarios.

Keywords

Sterile neutrinos; 3+1; Lorentz violation; DUNE; Deep Underground Neutrino Experiment; Atmospheric neutrinos; Neutrinos

Collaboration

other (fill field below)

other Collaboration

Subcategory

Future projects

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