

Analyzing light sterile neutrino at DUNE and the role of beam tune, neutral current and near detector

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The Deep Underground Neutrino Experiment (DUNE) is an upcoming long baseline neutrino experiment. In addition to exploring the yet unknown parameters in the standard three flavor neutrino sector, an ancillary goal of DUNE is to probe the subdominant effects induced by new physics such as a light eV-scale sterile neutrino. DUNE utilizes a wide band beam and provides us with an opportunity to utilize different beam tunes. We demonstrate that combining information from different beam tunes (low energy and medium energy) available at DUNE impacts its ability to probe some of the sterile parameters and modifies the allowed regions. We also perform a comparative analysis with different configurations including the addition of neutral current channels and using the simulated near detector data. We illustrate how using these various configurations can help us in exploring the sterile neutrino parameter space.

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