

Tau Neutrino Physics at DUNE

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Over the last two decades, the experimental understanding of three flavor oscillations has improved dramatically. However, almost all of our understanding of neutrino physics is due to the study of electron and muon neutrinos, and the tau neutrino remains the least well-studied particle in the Standard Model.

The Deep Underground Neutrino Experiment (DUNE) is a next-generation neutrino experiment currently under construction. DUNE will consist of two high-resolution neutrino interaction imaging detectors exposed to the world's most intense neutrino beam with the Near Detector at Fermilab and the Far Detector 1,300 km away in the Sanford Underground Research Facility in South Dakota. DUNE is therefore ideally suited to collect a high-statistics, high-purity sample of tau neutrinos to significantly improve our understanding of electroweak interactions and will offer crucial tests of the three-flavor paradigm. This capability can be further improved using a proposed high-energy beam mode.

In this talk, I will discuss prospects for analyses using tau neutrinos to assess the validity of the three-flavor model, search for short-baseline sterile-driven tau neutrino appearance in the Near Detector, and constrain the currently unmeasured F4 and F5 structure functions.

Working group

WG1

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