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## **Studies of tau neutrino appearance at the DUNE Near Detector complex**

*Monday, 18 July 2022 20:40 (20 minutes)*

The DUNE experiment will use the new LBNF (Long-Baseline Neutrino Facility) neutrino beam sampled at the Near Detector complex (DUNE ND), 574 m downstream of the production target, and at the Far Detector complex, 1300 km away at the SURF laboratory at a depth of about 1.5 km. The highly capable multi-component Near Detector complex, with a LAr TPC (Liquid Argon Time Projection Chamber) as its primary detector, enables DUNE to probe new physics beyond the Standard Model, including the possibility of short-baseline tau neutrino appearance mediated by sterile neutrino oscillations. Tau neutrino detection is particularly challenging due to the high energy production threshold of the tau lepton and its very short lifetime. However, the excellent spatial resolution of the Near Detector LAr TPC and the large statistics expected (particularly using the high-energy beam configuration) for the LBNF beam provide a unique opportunity to probe these exotic signatures. In this poster, we will present a study of DUNE's projected sensitivities to short-baseline tau neutrino appearance using the DUNE ND and discuss how the sensitivities are enhanced when combining the ND-LAr TPC with downstream components serving as magnetized muon spectrometers, including ND GAR or ND-GAR-Lite, and the SAND detector.

### **In-person or Virtual?**

In-person

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