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DUNE long-baseline oscillation physics sensitivity

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The Deep Underground Neutrino Experiment (DUNE) is a next generation, long-baseline neutrino oscillation experiment which will utilize high-intensity ν_μ and $\bar{\nu}_\mu$ with peak neutrino energies of ˜2.5 GeV produced at Fermilab, over a 1285 km baseline, to carry out a detailed study of neutrino mixing. The unoscillated neutrino flux will be sampled with a near detector complex at Fermilab, and oscillated at the DUNE far detector at the Sanford Underground Research Facility, which will ultimately consist of four modules each containing a total liquid argon mass of 17 kt.

Here, the long-baseline neutrino oscillation sensitivity of DUNE is determined, using a full simulation, reconstruction, and event selection of the far detector and a full simulation and parameterized analysis of the near detector. Detailed uncertainties due to the flux prediction, neutrino interaction model, and detector effects are included. DUNE's ultimate precision on CP-violation and the value of the CP-phase are discussed, along with DUNE's ability to resolve the mass ordering, the $\theta_2 3$ octant, and DUNE's expected precision on other oscillation parameters of interest.

Submitted on behalf of a Collaboration?

Yes

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