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Neutrinos in DUNE: long-baseline oscillations and non-beam physics

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The Deep Underground Neutrino Experiment (DUNE) is one of the most ambitious particle physics experiments of the next generation. DUNE consists of two detectors: the Near Detector (ND) - just downstream of the neutrino beam at FERMILAB (IL - USA), and the Far Detector (FD) - 1300 km away and 1500 m deep in the underground SURF laboratory (SD - USA). The ND is a multi-technology apparatus aiming to constrain the uncertainties related to the unoscillated neutrino flux and also to explore neutrino interactions physics. The FD is a modular 40 kton fiducial mass Liquid Argon Time Projection Chamber, dedicated to studying long-baseline neutrino oscillations, which includes precise measurements of neutrino mixing parameters, the CP violation phase as well as the determination of neutrino mass hierarchy. The physics list of DUNE extends to non-beam physics like supernova neutrinos and search for nucleon decay. In this contribution, we describe the main features of DUNE and its sensitivity for measurements on the primary physics goals.

Primary authors: KEMP, Ernesto (University of Campinas - UNICAMP); COLLABORATION, for the DUNE

Presenter: KEMP, Ernesto (University of Campinas - UNICAMP)

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