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An Experimental Program in Neutrinos, Nucleon Decay and Astroparticle Physics Enabled by the Fermilab Long-Baseline Neutrino Facility

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A new International Team (DUNE - Deep Underground Neutrino Experiment) has been formed to pursue an accelerator-based long-baseline neutrino experiment, as well as neutrino astrophysics and nucleon decay, with an approximately 40-kt (fiducial) modular liquid argon TPC (LAr-TPC) detector located deep underground and a high-resolution near detector. Several independent worldwide efforts, developed through years of detailed studies, are converging around the opportunity provided by the megawatt neutrino beam facility planned at Fermilab and by the new significant expansion with improved access at the Sanford Underground Research Facility in South Dakota, 1,300 km from Fermilab. The principle goals of this experiment are: a comprehensive investigation of neutrino oscillations to test CP violation in the lepton sector, determine the ordering of the neutrino masses, and test the three-neutrino paradigm; to perform a broad set of neutrino scattering measurements with the near detector; and to exploit the large, high-resolution, underground far detector for non-accelerator physics topics including atmospheric neutrino measurements, searches for nucleon decay, and measurement of astrophysical neutrinos especially those from a core-collapse supernova.

Oral or Poster Presentation

Oral

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