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The Long-Baseline Neutrino Experiment

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The Long-Baseline Neutrino Experiment is a broad scientific program being developed in the United States as an international partnership. LBNE consists of an intense neutrino beam produced at Fermi National Accelerator Laboratory (Fermilab), a highly capable set of neutrino detectors on the Fermilab campus, and a large underground liquid argon time-projection chamber (TPC) at Sanford Underground Research Facility (SURF) in the state of South Dakota. The high-intensity neutrino beam will allow LBNE to make high precision measurements of neutrino and anti-neutrino mixing separately. LBNE will make detailed studies of neutrino oscillations including measurements of the mass hierarchy and CP violation that take advantage of the 1300 km baseline afforded by this arrangement. At the near site, the high-statistics neutrino scattering data will allow for many cross-sections measurements and precision tests of the standard model. At the far site, the large underground detector will open a new window to the search for nucleon decay, supernova neutrinos, and interesting astrophysical phenomena. In this talk, we describe the beam and detectors and outline the broad physics program of LBNE.

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