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The DUNE Far Detector and ProtoDUNE (12' + 3')

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DUNE, the DEEP Underground Neutrino Experiment, will be a groundbreaking experiment for long-baseline neutrino oscillation studies, and for neutrino astrophysics and nucleon decay searches. Planning of DUNE continues to proceed rapidly. The DUNE Far Detector will consist of four 10-kiloton fiducial volume modular liquid argon time-projection chambers (LArTPC) placed deep underground at the Sanford Underground Research Facility in Lead, South Dakota, USA. The Far Detector will be coupled to the LBNF multi-megawatt wide-band neutrino beam planned for Fermilab. The LArTPC technology allows for detailed reconstruction of neutrino interaction and nucleon decay final states over an energy range from a few MeV to many GeV, providing high resolution vertex determination, precision charged particle tracking, particle identification, and calorimetry. Photon detector systems embedded within the LArTPC add precise timing capabilities for non-beam events. Designs for both single phase and dual phase LArTPC have reached advanced stages; and these designs will be tested through a full-scale prototyping program called ProtoDUNE, to be executed at CERN over the next few years.

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