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A Gaseous Argon-Based Near Detector for DUNE

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The main goals of the Deep Underground Neutrino Experiment (DUNE) are to measure CP violation in the lepton sector, make precise measurements of neutrino oscillation parameters, observe supernova burst neutrinos, and detect rare processes such as proton decay. To fulfill these goals, DUNE will use a highly capable suite of near detectors. Among the components of the DUNE Near Detector complex is a magnetized high-pressure gaseous-argon TPC (HPgTPC) surrounded by a calorimeter, designed to provide fine-grained tracking. Due to its low detection threshold, HPgTPC will be able to constrain one of the least-understood sources of uncertainties in the oscillation analysis: nuclear effects in neutrino-nucleus interactions. This talk will provide an overview of the on-going R&D efforts for HPgTPC including the Fermilab R&D program focused on placing a test stand in the Fermilab test beam and an R&D effort dedicated to investigating a GEM readout.

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