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P3.017 The ProtoDUNE large demonstrator of the Liquid Argon double phase TPC program at CERN

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The Deep Underground Neutrino Experiment (DUNE) will use a large liquid argon (LAr) detector consisting of four modules each with a fiducial mass of 10 kt of LAr. A liquid-argon TPC working in double phase mode has been proposed as one of the first modules of DUNE. This detector has excellent tracking and calorimetric capabilities.

The protoDUNE DP is a large demonstrator of the double phase liquid argon TPC with a $6 \times 6 \times 6 \sim \text{m}^3$ (about 300t) active volume. The TPC will be built inside a tank based on industrial LNG technology. Electrons produced in the liquid argon are extracted in the gas phase. Here, a readout plane based on LEM detectors provides amplification before the charge collection onto an anode plane with strip readout. PMT located on the bottom of the tank containing the liquid argon provide the readout of the scintillation light.

This demonstrator is an industrial prototype of the design proposed for a large underground detector. ProtoDUNE DP is under construction at CERN and will be exposed to a charged particle beam (0.5-20 GeV/c) in the North Area in 2018. The data will provide necessary calibration of the detector performances and benchmark sophisticated reconstruction algorithms. This project is a crucial milestone providing feedback for the long baseline neutrino DUNE program.