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Measurement of Electron Lifetime by the LAr Purity Monitoring System at ProtoDUNE-SP NITISH NAYAK, University of California, Irvine, DUNE COLLABORATION — The DUNE experiment is part of the next generation of neutrino oscillation experiments that seek to definitively answer key questions in the field. It will utilize liquid argon time projection chambers (LArTPCs) enabling sub-mm spatial resolutions for unprecedented sensitivity. As part of prototyping designs for such a detector, in particular the single-phase (SP) and dual-phase (DP) technologies, two ProtoDUNE detectors were built at the CERN Neutrino Platform. ProtoDUNE-SP was commissioned in Fall 2018, with test beam data taken immediately after that. A key component of the LArTPC energy calibration is the drift electron lifetime which corrects the charge attenuation caused by drift electrons captured by impurities. In this talk, I shall describe the analysis for measuring electron lifetimes with the PrM system and using that to perform a run-by-run calibration of the LArTPC charge response. This is a complementary analysis to the Cosmic Ray Tagger (CRT)-based measurement of the lifetime within the TPC volume and has important implications for DUNE where the CRT-based methods will be more challenging due to the lack of cosmic statistics.

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