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Measurement of Electron Transportation Properties in Liquid Argon for Large Liquid Argon Time Projection Chambers JYOTI JOSHI, YICHEN LI, XIN QIAN, CRAIG THORN, Brookhaven Natl Lab — Liquid Argon (LAr) Time Projection Chambers (TPCs) provide a powerful, robust and elegant solution for the detection of neutrinos and other weakly interacting particles above a few tens of MeV. An energetic charged particle transiting the liquid produces ionization electrons that are drifted with constant velocity along a uniform electric field. By detecting the location and timing of the arrival of these electrons on a readout plane, LArTPCs provide 3D imaging of interaction events with excellent spatial resolution. During the drift to the readout plane, the ionization electrons diffuse. The resulting increase in the size of the charge distribution is one fundamental limitation to reach high spatial resolution at long drift distance. In addition, accurate modeling of the LArTPCs performance requires an accurate knowledge of the diffusion. In this talk, we report the measurement of longitudinal electron diffusion coefficients for a range of electric fields, which is directly applicable to existing LAr TPC experiments such as MicroBooNE. We also present the ongoing R&D to advance our knowledge of LAr properties at BNL, which are essential for the design and optimal operation of future large LArTPCs such as the proposed LBNF far detector

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