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Hydrogen-rich Gases for DUNEs High Pressure Time Projection Chambers Near Detector PHILIP HAMACHER-BAUMANN, RWTH Aachen University, DUNE COLLABORATION — DUNE's near detector complex foresees a magnetized high-pressure gaseous time projection chamber (HPgTPC) as part of the ND-GAr near detector component. The gaseous active volume results in a very low detection threshold with high particle-identification power and large acceptance for tracking, especially for interactions on the gas itself. Neutrino interactions on hydrogen nuclei in the drift gas can be extracted with the transverse kinematic imbalance method to produce intra-nucleon-interaction-free neutrino samples. For design and development of a pressurized TPC, it is essential to quantify and validate microscopic tracking parameters, such as drift velocity, to ensure performance at large detector scales. In this presentation, I will discuss how electron swarm parameters of drift gas mixtures for TPCs perform at higher than atmospheric pressures. Additionally, a study of a choice of hydrogen-rich gas mixtures for consideration in the HPgTPC is presented in addition to measurements in a test chamber. The results are assessed with respect to performance at 10 bar pressure in the HpgTPC.

Philip Hamacher-Baumann
RWTH Aachen University

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