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Muon Momentum Estimation in ProtoDUNE Using Multiple Coulomb Scattering HUNTER MEYER, THOMAS KUTTER, Louisiana State University, FOR THE DUNE COLLABORATION — The Deep Underground Neutrino Experiment (DUNE) is a long baseline neutrino experiment using liquid argon detectors to study neutrino oscillations, proton decay, and other phenomena. The single-phase ProtoDUNE detector is a prototype of the DUNE far detector and is located in a charged particle test beam at CERN. It is critical to have accurate momentum estimation of charged particles for calibration and testing of the ProtoDUNE detector performance, as well for proper analysis of DUNE data. Charged particles passing through matter undergo multiple Coulomb scattering (MCS). MCS is momentum-dependent, allowing it to be used in muon momentum estimation while allowing for momentum estimation of muons exiting the detector, a key benefit of MCS over various other methods. We will present the status of the MCS analysis which was developed and evaluated using Monte Carlo simulations and discuss the bias and resolution of our momentum estimation method, as well as its dependencies on the detector resolution.

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