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Muon Momentum Determination with Multiple Coulomb Scattering for the MicroBooNE Experiment POLINA ABRATENKO, Univ of Michigan - Ann Arbor, MICROBOONE COLLABORATION — MicroBooNE is an experiment based at Fermilab that uses a Liquid Argon Time Projection Chamber (LArTPC) to investigate the excess of low energy events observed by the MiniBooNE experiment, study neutrino-argon cross-sections, and perform R&D for future LArTPC devices. MicroBooNE relies on the reconstruction of neutrino-induced muons for neutrino energy determination. However, a significant fraction of muons escape the detector. This talk describes a method for determining the momenta of escaping muons in LArTPC-based detectors. The technique uses information from multiple coulomb scattering to compute a muons momentum through the maximization of a likelihood algorithm. This method was applied to both simulation and data, with momentum resolutions for both measured to be around 20% at typical MicroBooNE energies. Given this, multiple coulomb scattering provides a promising route towards energy determination for muons that escape the detector, and allows MicroBooNE to fully reconstruct and study uncontained, often high energy, events from both the Booster and NuMI neutrino beams. I will present the status and performance of the algorithm applied to simulation and data.

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