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Constraining “Dirt” Backgrounds for the MicroBooNE Single Photon Low Energy Excess Search

MicroBooNE, a Liquid Argon Time Projection Chamber with an active volume of 85 metric tons, is located on the Booster Neutrino Beam at Fermilab and has been collecting data since fall 2015. One of its primary physics goals is to investigate the low-energy excess (LEE) of events observed by the MiniBooNE experiment in their measurement of charged current quasi-elastic-like electron neutrino (ν_e CCQE) events. “Dirt” backgrounds are beam-induced neutrino events originating outside the detector, producing final states inside the active detector volume mimicking the ν_e CCQE signature, and are non-negligible in the MiniBooNE search. The MicroBooNE search for anomalous single photon production in neutral current neutrino interactions, as a possible LEE interpretation, requires a good understanding of dirt backgrounds due to MicroBooNE’s higher surface-to-volume ratio than MiniBooNE. This poster presents an analysis developed to select a dirt-enhanced sample of events in MicroBooNE, demonstrating good data to Monte Carlo agreement.

Mini-abstract

Verifying modeling of events interacting outside but detected inside the MicroBooNE detector.

Experiment/Collaboration

MicroBooNE

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