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

Tuesday, 25 August 2020 14:45 (15 minutes)

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 talk will describe an analysis developed to select and isolate dirt events in MicroBooNE for the single photon LEE search, demonstrating good data to Monte Carlo agreement.

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