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Results from the MicroBooNE Low-Energy Excess Search

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MicroBooNE is a liquid argon time projection chamber detector designed to address the excess of low energy electromagnetic events observed by the MiniBooNE detector. Two hypotheses for this excess are explored by MicroBooNE: an electron-like excess coming from a larger than expected number of charged current (CC) ν_e interactions and a photon-like excess coming from neutrino-induced neutral current (NC) resonant Δ radiative decays. Data corresponding to MicroBooNE's first three years of operations are used to select single-photon events with one or zero protons and without charged leptons in the final state for the photon hypothesis. At the same time three independent electron neutrino analyses are performed across multiple single electron final states, including an exclusive search for two-body scattering events with a single proton, a semi-inclusive search for pionless events, and a fully inclusive search for events containing all hadronic final states. This talk will present first measurements of CC ν_e and single photons from NC Δ radiative decays in the MicroBooNE detector, two leading hypotheses for the excess. With differing signal topologies, statistics, backgrounds, reconstruction algorithms, and analysis approaches, the results are found to disfavor both hypotheses in favor of the nominal expectations from the Booster Neutrino Beam and no excess of electron neutrino or Δ radiative decay events are observed.

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