

Vertex-Finding and Reconstruction for Contained Two-track Neutrino Events in the MicroBooNE Detector

MicroBooNE is a 90 ton fiducial volume Liquid Argon TPC (LArTPC) neutrino experiment on the Booster Neutrino Beamline at the Fermi National Accelerator Laboratory. One of MicroBooNE's primary physics goal is to investigate the excess of ν_e seen by MiniBooNE in the [200-600] MeV range. MicroBooNE will constrain the excess of ν_e from their expected intrinsic component in the beam by using the ν_μ as a reference. Our Low Energy Excess analysis uses deep learning tools applied to high resolution images from LArTPCs. We present a novel 3D event reconstruction based on Computer Vision tools for vertex finding, and a stochastic neighbor search for the full track reconstruction.

In addition, we have developed a self-diagnostic that allows recognition of poorly reconstructed tracks. Using the output of our 3D reconstruction, and a first particle identification stage, we demonstrate an energy resolution of 5.5% over the [100-1500] MeV range on simulated muon neutrino events.

Authorship annotation

On behalf of the MicroBooNE collaboration

Session and Location

Wednesday Session, Poster Wall #73 (Auditorium Gallery Right)

Poster included in proceedings:

yes

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Track Classification: Poster (participating in poster prize competition)