Reconstruction and identification of neutrino-induced events with electromagnetic activity in the final state at the Short-Baseline Near Detector

Friday, 21 June 2024 17:30 (2 hours)

The Short Baseline Near Detector (SBND), a 112-ton liquid argon time projection chamber (LArTPC), is the near detector of the Short Baseline Neutrino Program at Fermilab. Due to its large mass and proximity to the Booster Neutrino Beam target, SBND will see a record-breaking number of neutrino interactions on liquid argon enabling a rich program of neutrino cross-section measurements. Of particular interest are channels resulting in final states dominated by electromagnetic activity, such as charged-current electron neutrino interactions and neutral-current neutral pion production, due to their relevance in electron neutrino appearance searches. In addition to the unprecedented statistics and the excellent
imaging of LArTPCs, SBND is also equipped with a cosmic ray tagger and a state-of-the-art photon detection system, outfitted with 312 optical detectors. The intersection of SBND's subsystems will not only provide precise, high-resolution measurements but will also support novel reconstruction techniques not previously achievable in LArTPCs, such as light calorimetry. This poster will give an overview of the current selections for the inclusive charged-current electron-neutrino and neutral-current neutral pion production channels, including the implementation of light calorimetric techniques and the use of all three SBND subsystems for cosmic rejection

Poster prize

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