

Studying Neutrino-Nucleus Interactions at SBND with Muon Neutrino Charged-Current Events with no Pions in the Final State

The Short-Baseline Near Detector (SBND), a liquid argon time projection chamber (LArTPC) located at Fermilab, will soon start collecting over a million neutrino events per year. For SBND and other neutrino experiments like DUNE, modeling neutrino-nucleus interactions with heavy nuclei at the few-GeV energy range is a significant challenge. In this range, neutrinos scatter on heavy nuclei through multiple interaction modes, and the final states are convoluted with various nuclear effects. Improved understanding of these interaction processes will broadly impact future oscillation measurements as well as exotic searches performed at neutrino facilities. This poster presents a study on events with a muon and no pions in the final state, the dominant exclusive event topology at SBND. We demonstrate the capabilities of SBND to provide high-statistics, high-purity data on this channel, and discuss how the unique features of this channel will lead to a better understanding of neutrino-nucleus interactions.

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