

A Preliminary ν_μ CC 0π Event Selection in SBND

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SBND is a Liquid Argon Time Projection Chamber (LArTPC) experiment and the near detector in the Short Baseline Neutrino (SBN) program at Fermilab. With a 110 m baseline and a 112 tonne active mass, the detector will observe $\sim 5,000,000$ charged current muon neutrino (ν_μ CC) interactions at energies of $\langle E_\nu \rangle \sim 650$ MeV in its 6.6×10^{20} POT (3 year) exposure. SBND will constrain the systematics on the event rate for sterile neutrino searches in the SBN program and have a rich program of neutrino cross-section measurements.

The most abundant topology in SBND, pionless charged current muon neutrino (ν_μ CC 0π), is a key channel for oscillation searches due to its simple final-state: a single muon, possibly several nucleons and no meson. However, the well-understood charged current quasielastic (CC QE) interaction on free nuclei is not sufficient to correctly model the ν_μ CC 0π final state in nuclear target experiments. This talk will demonstrate a preliminary ν_μ CC 0π selection using automated reconstruction in SBND, in an effort to fully understand its properties in a LArTPC for the purpose of making cross-section and oscillation measurements.

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