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Background Reduction in Neutrino Oscillation Analyzes for a Liquid Argon-based Long-Baseline Neutrino Experiment MATTHEW HOGAN, DANIEL CHERDACK, ROBERT WILSON, Colorado State Univ, LBNE COLLABORATION — The Long-Baseline Neutrino Experiment collaboration has developed a design for a next generation U.S. long-baseline neutrino experiment consisting of a large liquid argon neutrino detector 1300 km downstream of a wide-band neutrino beam. The goal of the experiment is to measure neutrino flavor oscillations, and to look for charge-parity symmetry violation (CPV) in the lepton sector. Simulations using a parametrized detector response are analyzed to determine the experimental sensitivity of the proposed design to CPV. Event selection algorithms, based on the identification of final-state lepton candidates, have a significant background acceptance from neutral-current (NC) interactions and charge-current (CC) ν_τ interactions producing τ leptons which decay leptonically. In this work an improvement in the rejection of CCν_τ and NC backgrounds is explored for ν_e- appearance and ν_μ- disappearance analysis samples. A multivariate analysis discriminator built from reconstructed kinematic variables, especially transverse momentum, has been shown to significantly improve background rejection with little loss in signal efficiency. Estimates for the improvements in background rejection and the changes in sensitivity for CPV determination will be presented.

Matthew Hogan
Colorado State Univ

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