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Measuring Neutral Pion Production in Muon Antineutrino Charged-Current Interactions at the NOvA Near Detector

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NOvA, a long-baseline neutrino oscillation experiment, is primarily designed to measure the muon (anti)neutrino disappearance and electron (anti)neutrino appearance. It achieves this by utilizing two functionally identical liquid scintillator detectors separated by 810 km, positioned in the off-axis Fermilab NuMI beam, with a narrow band beam centered around 2 GeV. Energetic neutral pions, originating from Δ resonance, deep-inelastic interactions, or final state interactions, pose a significant challenge to the measurement of the electron (anti)neutrino appearance. This challenge stems from the potential misidentification of photons from neutral pion decay as electrons or positrons. Leveraging high-statistics antineutrino mode data from the near detector, we perform a measurement of the differential cross section for muon antineutrino charged-current neutral pion production. In this talk, we will present a detailed analysis of our approach and findings.

Mini Symposia (Invited Talks Only)

Author: Dr WU, Wanwei (University of Pittsburgh)Presenter: Dr WU, Wanwei (University of Pittsburgh)Session Classification: Neutrino Physics

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