Contribution ID: **155** Type: **Poster**

Measurement of the Production of Λ Baryons in Muon Anti-Neutrino-Ar Interactions with the MicroBooNE Detector

The MicroBooNE detector is a liquid argon time projection chamber (LArTPC) with an 85 ton active mass that receives flux from the Booster Neutrino and the Neutrinos Main Injector (NuMI) beams, providing excellent spatial resolution of the reconstructed final state particles. Since 2015 MicroBooNE has accumulated many neutrino and anti-neutrino scatterings with argon nuclei allowing for searches of rare interaction channels.

The Cabibbo suppressed production of hyperons in anti-neutrino-nucleus interactions provides sensitivity to a range of effects, including second class currents, SU(3) symmetry violations and reinteractions between the hyperon and the nuclear remnant. This channel exclusively involves anti-neutrinos, offering an unambiguous constraint on wrong sign contamination. The effects of nucleon structure and final state interactions are distinct from those affecting the quasielastic channel and modify the Λ and Σ production cross sections in different ways, providing new information that could help to break their degeneracy. Few measurements of this channel have been made, primarily in older experiments such as Gargamelle [1,2]. This talk will cover the selection of candidate Λ events for the measurement of their production cross-section from Ar nuclei using the MicroBooNE detector.

[1] O. Erriquez et al., Nucl. Phys. B140, 123 (1978)
[2] O. Erriquez et al., Phys. Lett. B 70, 383 (1977)

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Session Classification: Poster session NB: do not use Safari; use Firefox, Chrome or Edge