Measurement of neutral current single π^0 production on argon with the MicroBooNE detector Auxiliary Materials

The MicroBooNE Collaboration

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Abstract

This document contains auxiliary materials that support the analysis presented in the paper titled "Measurement of neutral current single π^0 production on argon with the MicroBooNE detector", which is available as arXiv 2205.07943.

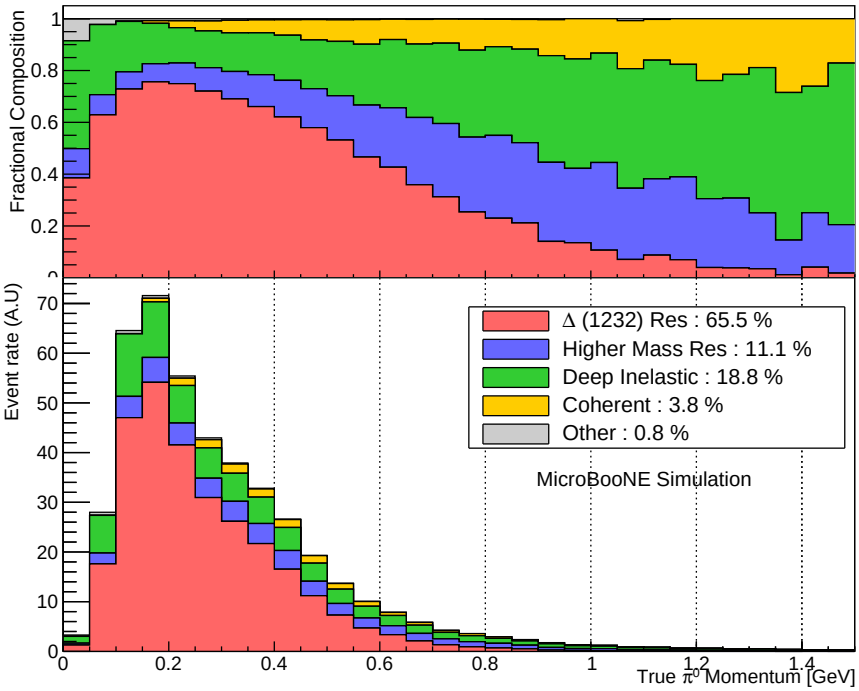


Figure 1: *A breakdown of the origin production process for all NC π^0 in the default GENIE v3.0 simulation, as a function of true π^0 momentum. Below 400 MeV, where the majority of our π^0 live, the majority are Resonantly produced via the Δ baryon; however, above 400 MeV, higher order resonances and deep inelastic scattering become the dominant processes. "Other" refers mainly to NC quasi-elastic.*

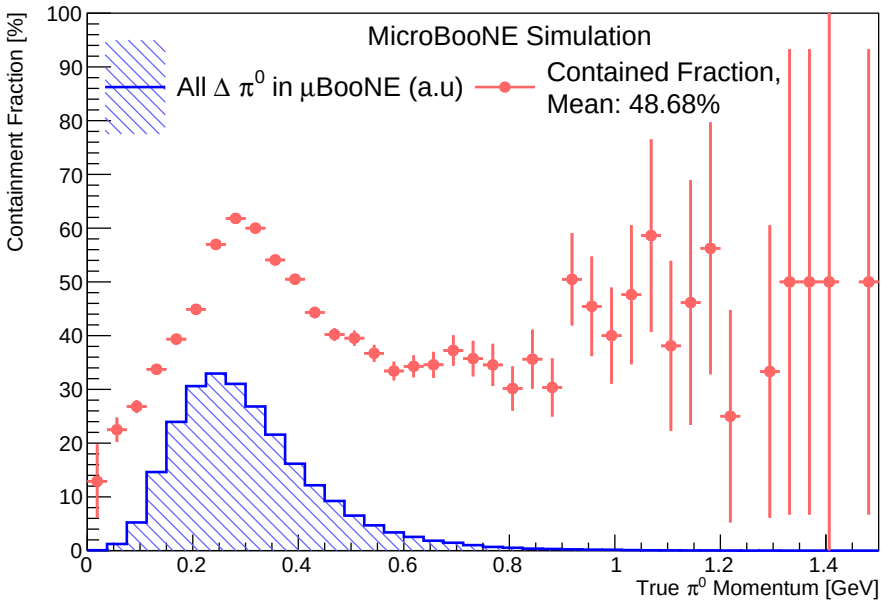
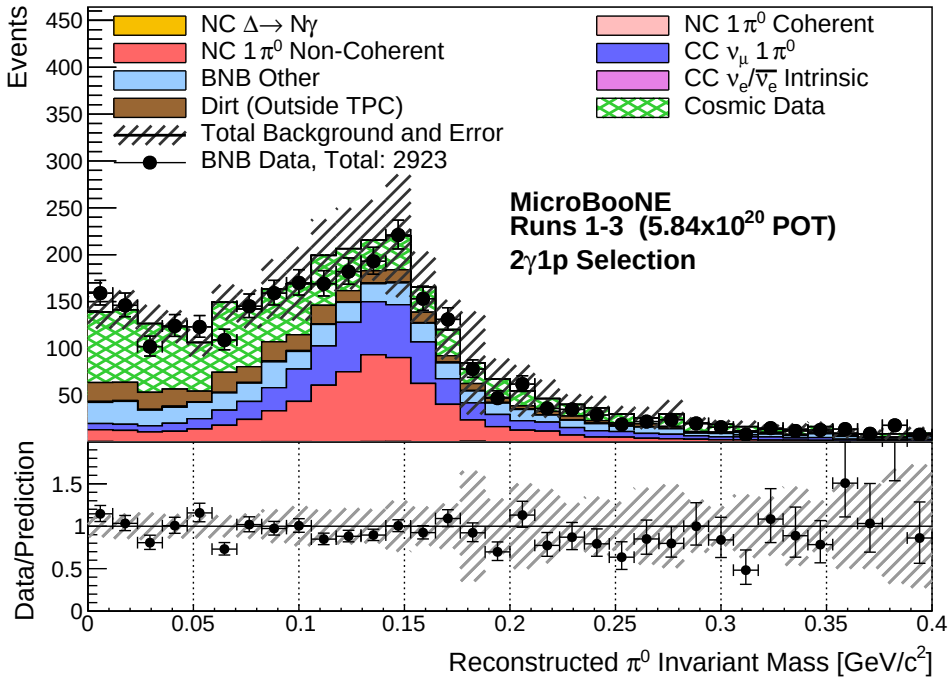
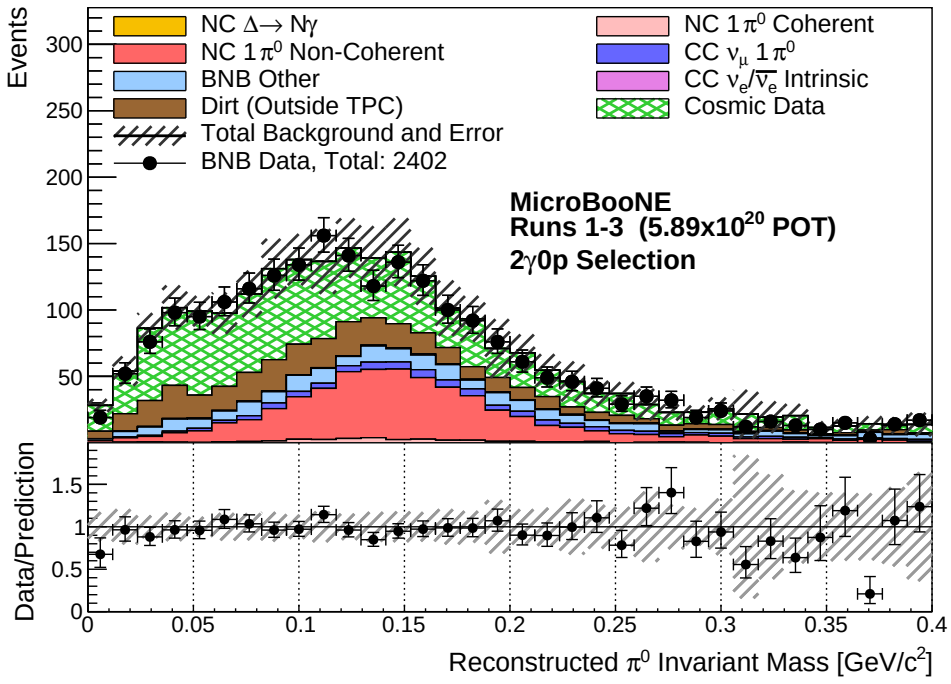


Figure 2: *The fraction of π^0 generated by neutrino interactions in argon that are contained inside the nucleus and do not exit, as a function the true π^0 momentum. The shape in the containment fraction is due to a Δ resonance in the absorption cross section. The blue spectra represents the true distribution. The red points are calculated as a ratio of all primary NC π^0 that escape the nucleus to all primary NC π^0 produced in the nucleus, i.e. do not include secondary π^0 produced from final state interactions.*



(a) $2\gamma 1p$



(b) $2\gamma 0p$

Figure 3: *Data/MC comparisons of the reconstructed π^0 invariant mass at the pre-selection stage for both signal topologies. The MC error bands include flux and cross-section systematics.*