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Likelihood-fit-based Pion-Ar Cross Section Measurement Using ProtoDUNE-SP

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ProtoDUNE-SP was a large-scale prototype of the single phase DUNE far detector which took test beam data in Fall 2018. The beam consisted of positive pions, kaons, muons, and protons, and this data is being used to measure the various hadron-Ar interaction cross sections. These measurements will provide important constraints for the nuclear ground state, final state interaction, and secondary interaction models of argon-based neutrino experiments. This talk will focus on the measurement of the pion-argon inelastic cross section broken down into three channels: absorption (no pions in the final state), charge exchange (a neutral pion in the final state), and other interactions. This measurement uses data collected with an central incident beam momentum of 1 GeV/c, and employs a likelihood fit as opposed to Bayesian unfolding to extract the cross sections.

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