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Semi-Inclusive, Single Pion Electro-production from a Deuterium Target. NARBE KALANTARIANS, University of Houston, BONUS COLLABORATION — Relative to the case for the proton, very little is known of Semi-Inclusive Deep Inelastic Scattering (SIDIS) physics resulting from a deuteron target. Electrons with energy of 5.3 GeV are used on both deuteron and proton targets to study single pion production in the SIDIS framework for all 3 pion charge states. What makes this specific experiment unique is that it offers a virtually free neutron target by tagging protons with momentum 70-150 MeV and scattering angle greater than 90° called ‘spectators’ that are detected by a radial time projection chamber that uses gaseous electron multipliers. The scattered electrons and resulting pions are then detected in the CEBAF Large Acceptance Spectrometer. The kinematic range covered is $W > 2\text{GeV}$, $Q^2 > 1\text{GeV}^2$, $0.1 < x_{Bjorken} < 0.5$, $0.3 < z < 0.7$, $P_t < 1\text{GeV}$. This study involves taking the ratios of the channel $ed \rightarrow e'(p_{spectator})\pi X$ for deuteron to proton targets, as well as tagged to untagged in the spectator scenario specifically for deuteron, and examining their dependence on certain kinematic variables of interest ($x_{Bjorken}, P_t, z, \dots$). From these ratios much can be learned about the deuteron including the gaining of some understanding of quark distributions in the proton and neutron. A look at the status of this study will be presented along with some preliminary results.

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