Separated Response Function Ratios in Forward Pion Electroproduction

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— The first complete separation of the four unpolarized electromagnetic response functions above the dominant resonances has been made for forward, exclusive $\pi^\pm$ electroproduction on the nucleon. Measurements were made above the resonance region at fixed invariant mass $W = 1.95$ GeV in the $Q^2 = 0.6 - 1.6$ (GeV/c)$^2$ range. The separated ratio $R_L = \sigma_L^- / \sigma_L^+$ is sensitive to any small isoscalar contamination to the dominant isovector pion exchange amplitude which is the basis for the determination of the charged pion form factor, $F_\pi(Q^2)$ from electroproduction data. A favorable value of this ratio may also have implications for constraining polarized GPD’s with ratios of longitudinal observables. At large $-t$, a separated ratio $R_T = \sigma_T^- / \sigma_T^+ \simeq 1/4$ would suggest a transition between pion knockout and quark knockout mechanisms. Preliminary results on the separate ratios $R_L$ and $R_T$ and their evolution with $-t$ will be presented and discussed.

$^1$Pion Form Factor Collaboration at TJNAF

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