Exclusive Electroproduction of the $\pi^0$ Meson off of the Nucleon

ANTHONY VILLANO, Rensselaer Polytechnic Institute — Nucleon transition amplitudes offer insight into the transition between hadronic degrees of freedom and quark-gluon degrees of freedom. Since many resonant excitations of the nucleon couple strongly to single pion production, one can hope to probe the interesting transition region through pion production measurements. A study of $\pi^0$ production from a nucleon target at $Q^2$ of 6.4 and 7.7 GeV$^2$ has recently been undertaken by the Jefferson lab Hall C collaboration. The differential cross sections can be used to constrain excitation form factors $G^*_M$ and several multipole transition amplitudes for the lowest lying nucleon excitation, the $\Delta(1232)$ resonance. Differential cross sections as they relate to both non-resonant processes and resonance excitations will be discussed. Information on the excitation form factors and multipole amplitudes will be presented along with the implications of various theoretical predictions.

Anthony Villano
Rensselaer Polytechnic Institute

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