

# Preliminary Results of Polarization Observables $T$ and $F$ in the $\vec{p}(\vec{\gamma}, \pi^0)p$ Reaction

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The theory which describes the interaction of quarks is Quantum Chromodynamics (QCD), but how quarks are bound inside a nucleon is not yet well understood. Pion photoproduction experiments reveals important information about the nucleon excited states and the dynamics of the quarks within it and thus provides a useful tool in the study of QCD. Detailed information about this reaction can be obtained in experiments which utilize polarized photon beams and polarized targets.

Pion photoproduction in the  $\gamma p \rightarrow \pi^0 p$  reaction has been measured in the FROST experiment at the Thomas Jefferson National Accelerator Facility. In this experiment circularly polarized photons with energies up to 3 GeV impinged on a transversally polarized frozen-spin target. Final-state protons were detected in the CEBAF Large Acceptance Spectrometer. Preliminary results of the polarization observables  $T$  and  $F$  have been extracted. The data generally agree with present partial-wave analyses, but also show marked differences. The data will constrain further partial-wave analyses and improve the extraction of proton resonance properties.

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