Polarization Observables for Kaon Photoproduction from Transversely Polarized Protons

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The search for undiscovered excited states of the nucleon continues to be a focus of experiments at Jefferson Lab. Recent LQCD calculations have confirmed the long standing quark model predictions of many more states than have so far been identified [1]. Polarization observables play a crucial role in this effort, as they are essential in disentangling overlapping resonant and non-resonant amplitudes. Recent coupled-channel analyses [2] have found strong sensitivity of the K+ Lambda channel to several higher mass nucleon resonances. In 2010, double-polarization data were taken at JLab using circularly and linearly polarized photons incident on a transversely polarized frozen spin butanol target (FROST) [3], operated at the low temperature of 30mK. The photons were energy-marked using the Hall B photon tagging system and the reaction products were detected in the CEBAF Large Acceptance Spectrometer (CLAS). We will present preliminary data of the T, F, and H asymmetries of the K+ Lambda and K+ Sigma final states with comparisons to predictions of recent multipole analyses. There are very few published measurements of the T asymmetry and none of the F and H asymmetries for the K+ Lambda channel. K+ Sigma has no published data for these asymmetries. This work is the first of its kind and will significantly broaden the world database for these reactions.

[1] R.G. Edwards et al., Phys Rev D84 074508 (2011).
[2] A.V. Anisovich et al., Eur. Phys. J. A48 (2012) 15.
[3] C.D. Keith et al., Nucl. Instr. Meth. A694 (2012) 27.