Electromagnetic K^+ production on light nuclei with beam and hyperon recoil polarizations

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Electro- and photo-production processes of K^+ on light nuclei are the most promising candidates that allow us to study the YN interaction in continuum. These are also important since they allow access to the elementary cross sections on the neutron, such as $\gamma + n \to K^+ + \Sigma^-$, in kinematic regions where final-state interaction effects are small. An inclusive $d(e, e'K^+)YN$ experiment has already been performed, while the data for $d(\gamma, K^+Y)N$ and ${}^3\mathrm{He}(\gamma, K^+Y)N$ are being analyzed at TJNAF.
We have analyzed the inclusive and exclusive $\gamma + d \to K^+ + \Lambda(\Sigma) + N$ processes [1]. These analyses incorporate the modern YN interactions of the Nijmegen group, NSC97 and NSC89, using an updated kaon production operator [2]. Sizeable FSI effects are found around the $K^+\Lambda N$ and $K^+\Sigma N$ thresholds, especially in polarization observables as shown in Fig.1. Now we are analyzing the $d(e, e'K^+)YN$ reaction, and starting a systematic study for the similar processes on ^{3}He.

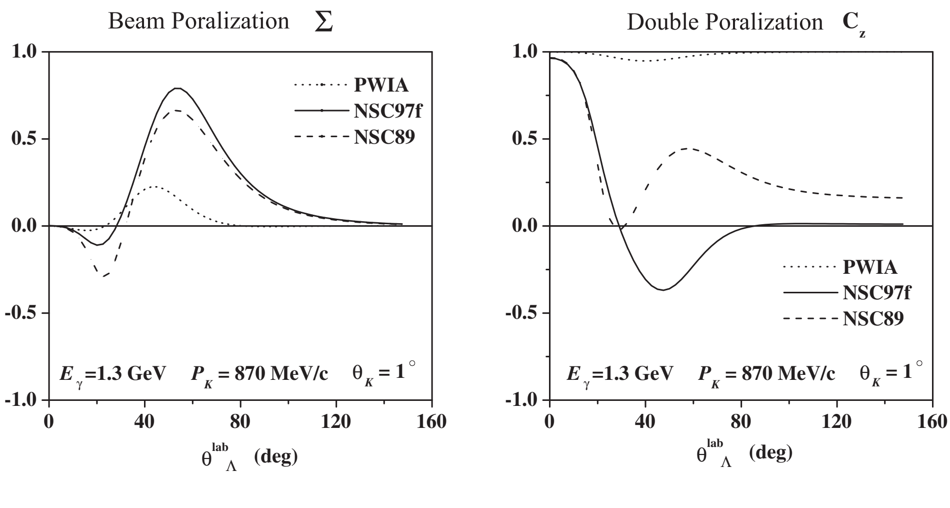

Figure 1: The beam polarization Σ and double polarization C_z for the $d(\gamma, K^+\Lambda)$ process, as functions of Λ scattering angle. The photon lab energy is $E_\gamma = 1.3$ GeV. The kaon lab momentum and angle are $p_{K^+} = 870$ MeV/c and $\theta_{K^+} = 1^\circ$ respectively.

References

[1] K. Miyagawa, H. Yamamura, T. Mart, C. Bennhold, H. Haberzettl, W. Glöckle Nucl.Phys. A691 (2001) 64; nucl-th/0011086.
[2] F.X. Lee et al., nucl-th/9907119; C. Bennhold et al., nucl-th/9909022.