K^+ photoproduction at SPring-8/LEPS

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The K^+ photoproduction can in principle give a new insight into the missing nucleon resonance problems. Some of nucleon resonances predicted by quark models, which have not been observed in pionic channels, could couple to the $K\Lambda$ and $K\Sigma$ channels. The $p(\vec{\gamma},K^+)\Lambda$ and $p(\vec{\gamma},K^+)\Sigma^0$ reactions give a good means to search for such nucleon resonances. In fact, an indication for observing such a missing resonance was found in the total cross section data of the $p(\vec{\gamma},K^+)\Lambda$ reaction measured by the ELSA/SAPHIR collaboration [1]. There still remains a controversy in the theoretical description of the cross section and the polarizarion obserbables of the $p(\vec{\gamma},K^+)\Lambda$ and $p(\vec{\gamma},K^+)\Sigma^0$ reactions. Therefore, additional observables are required to examine the models.

A linearly polarized photon beam is produced at the SPring-8/LEPS facility by backward Compton scattering. The polarization is about 95 % at the maximum photon energy. By using the linearly polarized photon beam, it is possible to measure the photon polarization asymmetry. The measurement of the $p(\vec{\gamma},K^+)\Lambda$ and $p(\vec{\gamma},K^+)\Sigma^0$ reactions was carried out from 2000 December to 2001 June. The photon beam asymmetries and the differential cross sections were measured in the photon energy range from 1.5 to 2.4 GeV and in the -t region from the threshold to 0.6 GeV. Since the LEPS spectrometer covers extremity forward angles, the experimental data in the kinematical regions, which cannot be accessed at other facilities, can be studied with good accuracy and statistics. In the presentation, preliminary results for the photon beam asymmetry and the differential cross section will be discussed.

References

[1] M.Q. Tran *et al.*, Phys. Lett. **B445** (1998) 20.