Backward production of ω mesons by linearly polarized photons at SPring-8/LEPS

T. Hotta[a] for the LEPS collaboration

[a] *Research Center for Nuclear Physics, Osaka University*

A measurement of backward photoproduction of ω mesons by linearly polarized photons is reported. A remarkable problem in baryon spectroscopy is so-called "missing resonance". Constituent quark models predict much more resonances than what have been observed in πN scattering and pion photoproduction measurements so far. One solution is that the missing resonances couple weakly to the πN channel but stronger to the ρN, ωN channels, etc. In ω photoproduction, dominant contribution from nucleon resonances around 1.9 GeV/c^2 is predicted[1] and the effect would be large at backward production angles. The model can be tested also by measuring the photon beam asymmetry. An old measurement in the photon energy range 2.8 GeV to 4.8 GeV observed a dip structure at $u = -0.15$ (GeV/c)^2 in the differential cross section[2]. However, it is not reproduced by recent model calculations[1]. New measurements have been awaited to confirm the structure. The experiment was carried out at the SPring-8/LEPS facility. A linearly polarized tagged photon beam was produced by backward Compton scattering of laser photons by 8 GeV electrons. The energy range of the beam was 1.5 GeV to 2.4 GeV. The beam was incident on a liquid hydrogen target and protons were measured at forward angles by the LEPS spectrometer. The events of the reaction γp $\rightarrow$ ωp at backward ω-production angles were identified by the missing mass.

References

[1] Y. Oh, A.I. Titov, and T.-S.H. Lee, Phys. Rev. C **63** (2001) 025201.
[2] R.W. Clifft *et al.*, Phys. Lett. **72B** (1977) 144.