

Polarization observables from the photoproduction of ω -mesons using Linearly Polarized Photons

Danny Martinez

Idaho State University

We report on the photon beam asymmetry Σ , and the Spin Density Matrix Elements (SDMEs), for the ω meson using a beam of linearly polarized photons in the photon energy region of $E_\gamma = 1.3$ to 1.9 GeV. The angular distribution of the ω meson and, in turn, the angular distributions of the daughter pions from ω decay give critical information on the mechanisms for the photoproduction of ω meson. By calculating the photon beam asymmetry parameter as function of the Mandelstam variables s and t ($\Sigma = \Sigma(s, t)$), constraints on the partial wave analyses used to extract the nucleon excitation spectrum from the available data can be done. It will help to distinguish between theoretical models which agree in the predicted cross section values, but are very different regarding the photon beam asymmetry parameter. The SDMEs, $\rho_{MM'}^0$ that parametrize the ω meson decay angular distribution, will provide an understanding of the reaction mechanism by showing dynamical information crucial in determining the spin and parity of the exchanged particle in the t -channel production process and deviations from the Vector Dominance Model (VDM). Since the ω is an isoscalar, it may only couple to N^* states, i.e. $I = \frac{1}{2}$. This eliminates Δ resonance production and makes for cleaner data samples. These preliminary results are from the g8b dataset collected in the summer of 2005 with the CLAS detector in Hall B of Jefferson Lab.