Vector meson production with linearly polarised photons at Jefferson Lab.

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Abstract

A Coherent Bremsstrahlung facility for the production of tagged, linearly polarised photons has recently been installed in Hall B at Jefferson Lab. The first production running with this facility will be in June/July 2001 when the g8 programme of experiments on vector meson production will take data. We will measure the decay products from the vector meson resulting from the reaction $\vec{\gamma}p \rightarrow VN$ in the energy range of $1.1 \leq \mathrm{E}_\gamma \leq 2.2$ GeV. Here, $V = (\rho,\ \omega,\ \text{or}\ \phi)$. In a practical sense, we will be measuring the angular momenta, and thus the spin density matrix elements $\rho^j_{\alpha\beta}$, which determine the angular distribution of the daughter spin-0 mesons that decay from the parent vector meson. With linearly-polarized photons, one has access to six more independent spin density matrix elements than can be obtained in an unpolarized vector meson photoproduction experiment. By using the CEBAF Large Acceptance Spectrometer (CLAS) and the photon tagger, we will accurately measure the decay angular distribution (and hence the spin density matrix elements) as functions of the scattering angle and the incident photon energy with high precision.

Several new and upgraded devices will be commissioned prior to production running. A report on the results of the commissioning and the status of the running experiment will be presented.