POLARIZATION OBSERVABLES IN DOUBLE PION PHOTO-PRODUCTION WITH CIRCULARLY POLARIZED PHOTONS OFF TRANSVERSELY POLARIZED PROTONS

LELIA NET

UNIVERSITY OF SOUTH CAROLINA

The study of excited states of the nucleon facilitates the understanding of the nucleon structure and its underlying symmetry and couplings. A main goal of the N^* program at the Thomas Jefferson National Accelerator Facility is to investigate the excitation and decays of the baryon resonances and assist in identifying the "missing" nucleon resonances that are predicted by theoretical models. One way to study the nucleon resonances is by extracting polarization observables, which provide more information than the unpolarized cross-section studies, e.g. access to the transition amplitudes of the reaction. Double-pion photoproduction contributes strongly to the total cross section at high energies and thus it plays an important role in probing the nucleon resonance spectrum. The CLAS g9b (FROST) experiment at Thomas Jefferson National Accelerator Facility provided double-pion photoproduction data using transversely polarized protons and circularly polarized photons, with energies up to 3.0 GeV. Beam- and target-polarization asymmetries were measured and the polarization observables $I^{\odot}$, $P_x^{\odot}$, $P_y^{\odot}$, P_x, P_y were extracted for the $\gamma p \to p\pi^+\pi^-$ reaction. The results are reported and compared with the calculations of an effective Lagrangian model. The data will help deepen the current knowledge of hadronic resonance decays and possibly assist in identifying new baryon resonances via PWA (Partial Wave Analysis) and in this way will contribute to a more comprehensive understanding of the strong interaction.