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Hyperon Resonance Photoproduction at CLAS

The photoproduction of hyperons and hyperon resonances is studied with the CLAS detector at Jefferson Lab using beams of photons in the energy range of 1 to 4 GeV. Much has been learned about how to theoretically model the photoproduction of the ground-state hyperons, including surprisingly simple rules of spin-transfer from the photon to the hyperon, leading to the introduction of new nucleon resonances that are not strongly observed in pion-scattering partial wave analysis (PWA). In addition, data on K photoproduction has extended the theoretical modeling to strange vector mesons and how their spin couples to the hyperon final state. Hyperon resonances are now being studied at CLAS, including the Λ resonances at 1405 MeV and 1520 MeV, and the Σ^* resonance at 1385 MeV. New results from CLAS will be presented.

Summary

The results on kaon-hyperon photoproduction suggest that a new nucleon resonance is seen at about 1900 MeV, which couples strongly to this production channel. Nearly complete spin-transfer from the photon to the hyperon is observed for few-GeV photons. In contrast, new data for K^* photoproduction shows a much smaller spin-transfer, suggesting that some of the spin is transferred to the vector meson. New data on the $\Lambda(1405)$ shows a marked deviation from expected isospin-symmetric decays, which suggests interference due to poles of dynamically-generated intermediate resonances. New results for the radiative decay of $\Sigma(1385)$ will also be presented.

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