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Double polarisation experiments in meson photoproduction

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Collaboration

CBELSA/TAPS

Abstract content

One of the remaining challenges within the standard model is to gain a good understanding of QCD in the non-perturbative regime. A key step towards this aim is baryon spectroscopy, investigating the spectrum and the properties of baryon resonances. To gain access to resonances with small πN partial width, photoproduction experiments provide essential information. Partial wave analyses need to be performed to extract the contributing resonances. Here, a complete experiment is required to unambiguously determine the contributing amplitudes. This involves the measurement of carefully chosen single and double polarization observables.

In a joint endeavor by JLab, MAMI, and ELSA, a new generation of experiments with polarized beams, polarized proton and neutron targets, and 4π particle detection have been started in recent years. Many results of unprecedented quality were recently published by all three experiments, and included by the various partial wave analysis groups in their analyses, leading to substantial improvements, e.g. a more precise determination of resonance parameters. In this talk, an overview of recent results in non-strange reactions is given, and their impact on our understanding of the nucleon excitation spectrum is discussed.

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