

POLARIMETRY IN MESON PHOTOPRODUCTION REACTIONS AT MAMI

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The photoproduction of mesons on a proton target provides a valuable tool for investigating the underlying structure of the nucleon. Theoretical models of quark confinement in the nucleon predict resonances that have not been observed experimentally. This could be because the very short lifetimes overlap and are not visible in existing data, or because the states do not exist. Measurements of such reactions provide insight into the nucleon resonance spectrum, including 'missing resonances'. Modern tagged photon facilities are now focusing on the measurement of double polarization observables, in particular experiments with a polarized beam and polarized target. The MAMI electron beam facility in Mainz, Germany allows for the production of high quality polarized photon beams for the study of meson photoproduction from nucleons. Such reactions can be characterized by 4 helicity amplitudes, resulting in 16 experimental observables. To fully constrain these amplitudes, 8 observables must be measured. Measurements of the recoil hadron polarization have been successfully achieved for kaon production where the decay of the produced hyperon acts as a polarimeter. For pion and eta photoproduction, the situation is less favorable and a subsequent nuclear scattering interaction is required to deduce the recoiling proton polarization. This talk describes a novel experiment to measure recoil polarization using the upgraded Glasgow-Mainz tagger along with the Crystal Ball and TAPS detector systems currently in place in the A2 hall at MAMI.

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