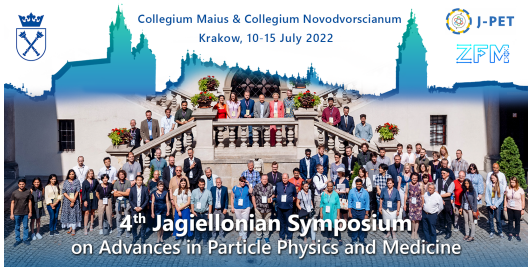

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Helicity dependent cross sections for the photoproduction of π0π± pairs from quasi-free nucleons

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Photon induced π0π±-pairs production from quasi-free nucleons bound in the deuteron has been investigated in view of the helicity dependence of those two reactions. Measurements with a liquid deuterium target were used to extract the unpolarized cross sections for protons and neutrons. A deuterated, longitudinally polarized butanol target together with a circularly polarized photon beam was also used to measure the double polarization observable E. Antiparallel and parallel spin configurations of the beam photon and target nucleon correspond to the spin-dependent cross sections σ1/2 and σ3/2 respectively, which have been derived from E. The measurements were done at the Mainz MAMI accelerator with tagged photon beams produced via bremsstrahlung from longitudinally polarized electron beams. The reaction products from the two target types were detected with an almost 4π solid-angle covering calorimeter composed of the Crystal Ball, TAPS detectors and particle identification detectors. The results are sensitive to sequential decays of nucleon resonances via intermediate states and also by emission of charged ρ mesons. Furthermore, the results have been compared to the recent available model calculation.

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