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The Near-Threshold Pion Photoproduction Program at MAX-lab
G.V. O'RIELLY, Univ. of Massachusetts Dartmouth, MAX-TAGG COLLABORATION — Pion photoproduction near threshold is a fundamental process that can be used to test the predictions of chiral effective-field theories, dispersion theoretical approaches and other quark-based models of the nucleon. Despite the importance of having data on the energy and angular dependence for all four pion channels in the near-threshold region, only the $\gamma p \rightarrow \pi^{\circ} p$ channel has been studied extensively. The new Photon Tagging Facility at MAX-lab is uniquely suited to study pion photoproduction between threshold and the Δ-resonance. A comprehensive program to investigate both charged channels, $\pi^{+} n$ and $\pi^{-} p$, as well as the neutral channel $\gamma n \rightarrow \pi^{\circ} n$ is underway at MAX-lab. This includes measurements of the angular distributions for π^{+} photoproduction from the proton and heavy nuclei in order to investigate the p-wave contributions to this process, as well as a measurement of the total cross section for $\gamma n \rightarrow \pi^{-} p$ to enable the determination of the threshold $E_{0^{+}}$ $(\pi^{-} n)$ amplitude. Complementing these measurements of the charged pion channels and the existing data on the $\pi^{\circ} p$ channel, an experiment to measure neutral pion photoproduction off the neutron is being developed. An overview of the planned MAX-lab pion program, together with preliminary results from measurements already performed will be presented.

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