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Electromagnetic production of strangeness

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The Mainz Microtron (MAMI), operated by the Institute for Nuclear Physics at the Gutenberg University Mainz, provides unpolarized and polarized electron beams of up to 1604 MeV energy. These beams have been used in the multi-spectrometer facility (called A1) to probe kaon electro-production reactions including studies of hypernuclei. In parallel, studies of photo-induced kaon production reactions used the Crystal Ball and TAPS multiphoton spectrometers together with the
photon tagging facility (called A2).
The A2 Collaboration measured $\gamma p \rightarrow K^+\Lambda$, $\gamma p \rightarrow K^+\Sigma^0$, $\gamma n \rightarrow K^0\Lambda$, $\gamma n \rightarrow K^0\Sigma^0$ and $\gamma p \rightarrow K^0\Sigma^+$ cross sections as well as recoil polarization in the latter reaction. Neutral kaon events were reconstructed using $K^0 \rightarrow \pi^0\pi^0$ decays and charged kaon events were accessed through the dominant decay modes $K^+ \rightarrow \mu^+\nu$ and $K^+ \rightarrow \pi^+\pi^0$. These experiments provide insight into the properties of N* resonances, in particular of those states that couple only weakly to the πN channel.
The A1 Collaboration pioneered the strangeness-tagged decay-pion spectroscopy. Precise Λ-binding energies of light hypernuclei, accessible by this method, are of high importance for understanding the Λ–N interaction and are used to constrain state-of-the-art calculations that describe the internal structure of nuclei. An experiment is currently running at MAMI to determine the hypertriton Λ-binding energy that is an important piece in the so-called lifetime puzzle of strangeness nuclear physics.
At MAMI, the direction of future experiments is moving away from strangeness production channels. Further, the University is currently constructing the novel continuous-wave multi-turn electron accelerator MESA. Its maximum beam energy will be 155 MeV, below all strangeness production thresholds.

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Classifica Sessioni: Parallel 1

Classificazione della track: Hyperon production with electromagnetic probes