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Detection of K^+ mesons in segmented electromagnetic calorimeters

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Summary

The combination of the CrystalBall and TAPS electromagnetic calorimeters were installed in the MAMI A2 hall in 2003. Here they are able to detect the reaction products from photo-induced reactions in combination with the Glasgow photon tagger.

In the first round of data taking they allowed a diverse series of experiments such as the study of eta decays, radiative delta decay, multi-pion photoproduction using a proton target as well as coherent pion production and medium modifications on nuclear targets.

In the last two years the MAMI-B electron beam was upgraded from 880MeV to the 1.5GeV MAMI-C, the A2 photon tagger underwent a similar upgrade. One significant aspect of this was it crossed the threshold for strangeness photoproduction experiments. The intense photon beam with excellent energy resolution from the tagger

now give the A2 collaboration the opportunity to make detailed measurements of strangeness photoproduction close to threshold. The challenge is to identify K^+ mesons above the background from other charged hadrons, where the relative Kaon cross

section is very small and the detector setup does not benefit from a magnetic field to help separate particle species. One solution outlined in this presentation is to identify the decay of the K^+ stopped in the either of the calorimeters through different time signatures in neighbouring crystals and use this to tag a strangeness reaction.

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