

MAMBO

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1 Introduction

MAMBO groups together two complementary INFN activities in Germany, both aimed at studying the excited spectrum of the nucleon: the experimental program with the MAMI-C microtron in Mainz and the BGO-OD experiment at Bonn-ELSA. LNF are involved in the latter activity.

2 BGOOD experiment

The BGOOD experiment is performed in collaboration between INFN sections of Roma2, LNF, Pavia, ISS-Roma1 and Torino, the University of Messina, the University of Bonn, Physikalisches Institut, ELSA department, the University of Bonn, Helmholtz Institut für Strahlen- und Kernphysik, the University of Edinburgh, the National Science Center Kharkov Institute of Physics and Technology, the University of Moscow, Russia, the Petersburg Nuclear Physics Institute (PNPI), Gatchina, the Idaho State University and the University of Basel. More than 70 physicists participate in this experimental program foreseen to last until 2020 with possible extension.

The INFN instrumental contribution consists in the *Rugby Ball* calorimeter and associated detectors previously used at GRAAL, the target system, the cylindrical tracking chambers and the MRPC detector. In the collaboration management, LNF expresses the co-spokesperson and one of the experiments to be performed as advised by the joint MAMI-ELSA PAC is led by LNF as well (η' photoproduction near threshold).

3 Activity in 2018

During 2018 the BGO-OD continued the production period. The ELSA planning allowed for two periods of data taking, each lasting three weeks. With the new long target cell installed, a first deuterium run was successfully achieved. The second period with hydrogen target was shorter than planned due to the failure of the septum magnet for beam extraction. Data analysis is ongoing. Preliminary results were obtained for $K^+\Lambda$ with forward going kaon. These are shown in Fig. 1 where 1/3 of the statistics was analysed.

The experiment is now routinely capable of producing a photon beam of intensity $3 \cdot 10^7 s^{-1}$ very close to the design value of $5 \cdot 10^7 s^{-1}$. The beam can be polarised *via* the technique of the coherent *Bremsstrahlung*. around 1.5 GeV, the region of major interest, a degree of linear polarisation ~ 0.4 was obtained. The alignment of the diamond crystal with the electron beam is performed with the *Stonehenge* technique, and the degree of polarization is continuously monitored.

The beam polarisation is rotated every 5 minutes by 90° and the beam asymmetry can be extracted from both photon polarisation states.

The commissioning of the MRPC detector, built by Roma2 and LNF, has continued with technical intervention aimed at the reduction of the noise. The detector will be commissioned before next summer.

4 Planned activity in 2019

The ELSA schedule and the concurrence of the CB-ELSA experiment and test beam measurements for high energy experiments will allow for two periods of data taking, each lasting three weeks. One data taking period of 21 days is scheduled in May 2019 in and a second period is expected to take place in September/October 2019.

Data analysis will continue for η and η' photoproduction channels close to the η' threshold.

The technical paper of the BGO-OD experiment is under preparation and will be completed in the next weeks.

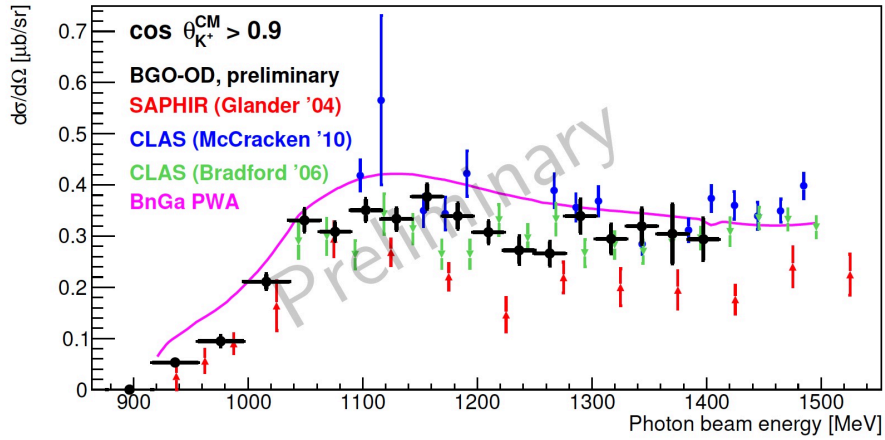


Figure 1: Cross section for $\gamma + p \rightarrow K^+\Lambda$ for forward going kaons, compared to existing measurements and with Bonn-Gatchina partial waves analysis (preliminary results).