

## 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 A2 with the MAMI-C microtron in Mainz and the BGOOD 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, 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 Institute for Nuclear Research (INR) Moscow, the University of Moscow, the Petersburg Nuclear Physics Institute (PNPI), Gatchina, the Institute for Nuclear Research of NASU Kyiv, and the Lamar University. In 2023 the Kharkiv Institute of Physics and Technology joined the collaboration. More than 70 physicists participate to this experimental program foreseen to last until the end of 2025.

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 ( $\eta'$  photoproduction near threshold).

### 3 Activity in 2023

In 2023 only one data taking period was performed due to an ELSA failure. Extraordinary maintenance of the BGO electronics was performed as well and the cryogenic target cell was replaced, as programmed.

Data analysis was continued in various channels including Kaon and  $\eta$  photoproduction off the neutron and proton,  $\eta'$  photoproduction off the proton at threshold and various channels associated with the coherent meson photoproduction off the deuteron.

### 4 Planned activity in 2024

ELSA is expected to continue the normal beam delivery to the experiments in 2024. No particular hardware or upgrade interventions are foreseen for the rest of the year. The experiment will continue data taking until the end of 2025 when a long shutdown of ELSA is planned.

The present situation with a war between Russia and Ukraine prevents the colleagues from Russia to participate to the experiment, with a strong impact in the collaboration.

## **5 Publications**

Eur. Phys. J. A (2023) 59:254