

APPLICATION

for participation in the competition for JINR annual prizes
for methodology, research and technology papers 2024

Scientific team (all LHEP):

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5. Makankin Aleksandr Mikhailovich (1,0) – Senior Engineer, Sector 2, Scientific and Experimental Department of Physics at CMS
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9. Khabarov Sergey Vadimovich (1,0) – Senior Researcher, Sector 2, Scientific and Experimental Department of Baryonic Matter at the Nuclotron
10. Yurevich Vladimir Ivanovich (1,0) – Head of Sector, Sector 2, Scientific and Experimental Department of Heavy Ion Physics at RHIC

Cycle of Papers

Development of the BM@N spectrometer at the NICA accelerator complex

on the topic 02-1-1065-2007/2026: *NICA Complex: Design and Construction of the Complex of Accelerators, Collider and Physics Experimental Facilities at Extracted and Colliding Ion Beams*

Aimed at Studying Dense Baryonic Matter and the Spin Structure of Nucleons and Light Ions, and at Carrying out Applied and Innovation Projects

Abstract

The BM@N spectrometer is designed to conduct fixed-target experiments on the extracted beam of the Booster-Nuclotron accelerator complex and is the first large experimental setup created within the NICA project. The main goal of the BM@N physics program is to study dense nuclear matter formed in nucleus-nucleus collisions at beam energies of 1.5 – 5 AGeV. The program includes a series of measurements in beams of light (C), medium (Ar, Kr) and heavy (Xe, Bi) relativistic nuclei. To implement this program, the experimental setup has been equipped with modern detector systems over the past few years. The design and testing of these systems are described in the publications submitted for the competition. In addition, a range of works was carried out to prepare the spectrometer for experiments with heavy ion beams. In December 2022 – January 2023, the first physics run was performed at the set-up with the Xe + CsI reaction at Xe beam energies of 3.0 AGeV and 3.8 AGeV. During the run, experimental data with statistics of more than 500 million events were collected, and all detector subsystems demonstrated compliance with the design parameters. A detailed technical description of the spectrometer and its major subsystems is presented in a paper published in the journal *Nuclear Instruments and Methods* in 2024.