

# A method of calculating the electric field map of triple GEM detector for the first physics run of BM@N experiment

Thursday, 14 July 2022 18:10 (20 minutes)

BM@N (Baryonic Matter at Nuclotron) [1] is the first stage experiment which is carried out at the NICA (Nuclotron-based Ion Collider fAcility) accelerator complex [2] located at Joint Institute for Nuclear Research in Dubna. The main purpose of the experiment is to study dense baryonic matter as a product of heavy ion collisions.

This work concentrates on the features of simulation for the core BM@N tracking detector based on triple GEM (Gas Electron Multiplier) system [3]. In particular, we will describe in detail the preparation of electric field map needed for detailed simulation of this detector. We will review the main steps of the field map preparation based on using special software such as GMSH [4], Elmer [5] and Garfield++ [6]: toolkits for finite element mesh generation, electric field calculation and simulation of physics processes in gaseous and semiconductor detectors.

Our computations are based on the particular conditions and properties of GEM chambers used in the first physics experimental run that scheduled to be performed in 2022. The principal difference of the future run from the previous is in their purposes. The previous runs, being focused on testing detector facilities, were mainly technical but the new ones are aimed to get some physics results that had been claimed in the scientific program of the BM@N experiment.

1. BM@N Conceptual Design Report: [http://nica.jinr.ru/files/BM@N/BMN\\_CDR.pdf](http://nica.jinr.ru/files/BM@N/BMN_CDR.pdf)
2. NICA White Paper. <http://theor0.jinr.ru/twiki-cgi/view/NICA/NICAWHITEPAPER>
3. D. Baranov et al., JINST, 12, C06041 (2017)
4. GMSH resource: <http://gmsh.info>
5. Elmer resource: <http://www.csc.fi/fi/web/elmer>
6. Garfield++ resource: <https://gitlab.cern.ch/garfield/garfieldpp>

## The speaker is a student or young scientist

Yes

## Section

1. Intermediate and high energies, heavy ion collisions

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**Session Classification:** Intermediate and high energies, heavy ion collisions