

Reconstruction of energy and heavy ion collision point at FHCAL (MPD)

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At present, in Dubna, Russia a new acceleration complex NICA is approaching final stages of its construction. At collider, there will be two major detectors, one of them, Multi-Purpose Detector (MPD), is going to be used for studying properties of dense baryonic matter. One of the most important parts of MPD is Forward Hadron Calorimeter (FHCAL). FHCAL will consist of two arms: left and right, which will be positioned symmetrically centre of MPD. Both arms have module structure and will consist of 44 modules each.

The main goal of FHCAL is measurement of centrality and determination of reaction plane of collisions. Another important goal, which this work is dedicated to, is reconstruction of heavy ion collision point. To reconstruct energies inside FHCAL a procedure of energy calibration needs to be carried out. This procedure is described in detail in my work. It was done on cosmic muons on a test stand of 3x3 modules. The resulting light yield is close enough in all sections in modules, which indicates good quality of produced modules. In order to estimate the expected accuracy of point collision measurement Monte-Carlo simulation was made and dependency of energy distribution in FHCAL modules on coordinate of ion collision was studied. According to calculation estimated accuracy of collision point reconstruction was found to be 21 cm. Another method of ion collision point reconstruction that is based on measurement of difference of time when spectators reached FHCAL arms was developed. The estimated accuracy of this method is better than 10 cm.

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