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Forward hadron calorimeter (FHCAL) at MPD/NICA.

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Forward hadron calorimeter (FHCAL) is intended for the measurements of the geometry of heavy ions collisions. The main purpose of the FHCAL is to provide an experimental measurement of a heavy-ion collision centrality and orientation of its reaction plane. Precise event-by-event estimate of these basic observables is crucial for many physics phenomena studies to be performed by the MPD experiment.

FHCAL consists of two identical left/right arms placed at the distance of about 3.2 meters from the beam collision point. This is a compensating lead-scintillator calorimeter designed to measure the energy distribution of the projectile nuclei fragments (spectators) and forward going particles produced close to the beam rapidity. The main design requirements of the FHCAL are (a) forward rapidity coverage and sufficient energy resolution to allow for precise collision centrality determination and consequently of the number of participating nucleons and (b) granularity in the plane transverse to the beam direction which is needed for the reaction plane reconstruction. The proposed modular design of the FHCAL covers large transverse area around the beam spot position such that most of the projectile spectator fragments deposit their energy in the FHCAL.

The expected FHCAL centrality resolution is below 10% for the most parts of the events, excluding the most central ones, where the internal fluctuation of the number of spectators is significant. At the same time, the proper transverse segmentation and the energy resolution of FHCAL ensures the reconstruction of the event plane orientation with the accuracy of about 30^0.

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