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New forward hadron calorimeter for the BM@N heavy ions experiment

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Forward hadron calorimeter with transverse and longitudinal segmentation has been developed and constructed for the upgraded fixed target BM@N experiment at JINR, Dubna. The main purpose of this calorimeter is to provide event-by-event centrality and reaction plane orientation measurements in nucleus-nucleus collisions.

The design of the hadron calorimeter composed of sampling lead/scintillator modules with a beam hole in the center will be discussed. The light collection from longitudinal sections in modules is provided by Wave Length Shifting (WLS) fibers embedded in scintillator plates. Micropixel photodetectors (Hamamatsu MPPCs) are used for light detection from each longitudinal section of modules. The measured light yield is about 50 ph.el. per section for MIPs. Sampling ADCs are used for signal readout in the calorimeter.

To measure charged fragments escaped the calorimeter through the beam hole the quartz beam hodoscope is developed. The expected doses and neutron fluences for the BM@N forward hadron calorimeter at high heavy ion beam rates has been simulated by the Fluka program. The response of the supermodule composed of 3 x 3 array of modules measured at proton beam energies 1 - 9 GeV at CERN will be shown.

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