

Compact segmented hadron calorimeter for detection of low energy spectators at MPD/NICA facility.

The forward hadron calorimeter (FHCAL) for the detection of the protons and neutrons in energy range of 1-5 GeV is discussed. Since the calorimeter will operate inside the superconductive magnet with limited available space its length is about one meter only. A single FHCAL module consists of 42 lead/scintillator sandwiches arranging in overall 4 interaction lengths. However, it works well for the low energy hadrons below 10 GeV. The FHCAL module consists of 7 longitudinal sections that allow the measurements of the hadron shower profile in the calorimeter. Also, longitudinal segmentation makes possible to select the tracks of the muons with different geometry to perform the energy calibration. The deposited energy from hadrons at such low energies are comparable with that from the minimum ionizing particles. Therefore, the attention was paid to increase the light yield in each longitudinal section. The use of WLS-fiber light readout and advanced photodetectors (Hamamatsu MPPCs) allows the reliable detection in each section of the cosmic muons with the different tracks. The beam tests of the calorimeter modules with 10 longitudinal sections at CERN PS with the proton momenta below 10 GeV/c confirmed the expected performance. As was shown, 4 interaction lengths are enough to contain the hadron shower and to ensure the energy resolution with the stochastic term of about 55%. The energy depositions in different sections and the shower profile are discussed.

Primary author: IVASHKIN, Alesandr (Russian Academy of Sciences (RU))

Co-authors: FINOGEEV, Dmitry (Russian Academy of Sciences (RU)); GUBER, Fedor (Russian Academy of Sciences (RU)); GOLUBEVA, Marina (Russian Academy of Sciences (RU)); MOROZOV, Sergey (Russian Academy of Sciences (RU))

Presenter: IVASHKIN, Alesandr (Russian Academy of Sciences (RU))

Session Classification: Poster Session A

Track Classification: Calorimeters