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Methods of signal processing and cosmic muon calibration for the BM@N and CBM sampling lead/scintillator hadron calorimeters.

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Recently developed new forward lead/scintillator sampling hadron calorimeters with transverse and longitudinal segmentation will be used in the upgraded BM@N (Baryonic Matter at Nuclotron) experiment at the Nuclotron-NICA acceleration complex in JINR (Dubna) as well as in the CBM (Compressed Baryonic Matter) experiment at the future Facility for Antiproton and Ion Research (FAIR, GSI). These calorimeters are very important for measurements of centrality and reaction plane orientation in heavy-ion collisions. Digitizing of analog signals in a wide dynamic range with sampling ADC is led to strong fluctuations of the measured charge. The new procedure of signal processing based on the Prony least squares fit method has been developed to improve the response and minimize the machine time. In addition, fitting of the signals with a known function allows one to select effectively weak signals on the level of electronic noise, that is important for performing a calibration of calorimeter sections on cosmic muons for the BM@N and CBM experiments.
New methods of signal processing for forward hadron calorimeters will be presented. The application of this method for energy calibration will be shown for finding tracks of cosmic muons based on transverse and longitudinal segmentation using the CBM calorimeter prototype with the sampling ADC readout and the recently constructed forward hadron calorimeter at BM@N.

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