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Design of Readout Electronics for CEPC Semi-Digital Hadronic Calorimeter Pre-research

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This research is intended to provide a feasible readout system for high granular Semi-Digital Hadronic CALorimeter (SDHCAL) in the proposing high energy Circular Electron Positron Collider (CEPC). A system including readout pads array, Front-end Electronics Board (FEB) and Detector InterFace (DIF) board is designed and fully tested. This system is applied on a double layers GEM detector. The effective area of GEM detector is 30cm $\times$ 30cm with the readout segment sized 1 cm$\times$1cm. The FEB is equipped with low consumption daisy-chained chips named MICROROC (MICRO-mesh gaseous structure Read-Out Chip). The DIF board is in charge of slow control distribution and data transmission. An auto test method is developed to calibrate the system quantitatively. As a result, the RMS noise of the system is below 0.35fC. The dynamic range is up to 500fC and the gain variation is better than 1% among channels. Cosmic-ray test shows the crosstalk between neighboring pads is less than 1.5%. The results obtained with small size detector show that the scheme is successful and can be applied on the large sized GEM detector readout.

Minioral

Yes

Description

system

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