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Pattern recognition at CEPC HCAL prototype using test beam data at CERN (poster-ID36)

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A particle flow oriented high granularity Analog Hadronic Calorimeter (AHCAL) has been designed for the Circular Electron Positron Collider (CEPC). An AHCAL prototype consisting of 40 longitudinal layers with a transverse granularity of $40 \times 40 \ cm^2$, using scintillator tiles as active material and stainless steel as absorber, has been constructed and tested at the CERN SPS H2 beam line. About 30 millions of test-beam data corresponding to muon, electron, and charged pion events are collected.

We developed a pattern recognition algorithm based on fractal dimension and average hit energy. The FD serves as a characteristic property of a fractal, providing a quantitative descriptor of the complexity of the shower shape, and is designed for high granularity calorimeters with good separation power. Using this algorithm, we quantified the PID efficiency with Monte Carlo samples. The noise, MIP, EM, hadronic components and other interesting events in the data are observed and separated by artificial cuts. The fractions of these components as a function of beam energy are estimated. This algorithm performed a good purity analysis of the test beam data.

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