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Beam tests of the CEPC AHCAL prototype

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The Circular Electron Positron Collider (CEPC) is a next-generation electron-positron collider proposed for precision measurement of the properties of the Higgs boson. A major challenge for the CEPC detector is achieving a boson mass resolution (BMR) of 4%, which is required to separate the Higgs, Z, and W bosons in their hadronic decays. The baseline design of the CEPC detector was guided by the particle flow algorithm (PFA) concept to satisfy the BMR requirements. The BMR performance obtained by the PFA approach is primarily determined by the shower separation capability and energy resolution of the calorimeters of the detector system. A hadronic calorimeter with high granularity is crucial for providing the required separation power and energy resolution for the desired BMR. In this context, the analogue hadron calorimeter (AHCAL), a scintillator hadronic calorimeter with analogue readout, is a potential hadronic calorimeter option for the CEPC detector. In this talk, We will introduce the performance and validation of AHCAL based on MC and the beam test results, including the energy response to high energy electrons (1-100 GeV/c).

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