

Shower characteristics of particles with momenta up to 150 GeV in the CALICE scintillator-tungsten HCAL

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In the R&D effort towards detectors at future high-energy colliders, CALICE is studying novel options for more compact hadron calorimeters. Using tungsten as dense absorber material appears to be an attractive alternative to iron. In this talk, a study of showers initiated by electrons, pions, kaons, and protons with beam momenta up to 150 GeV in the CALICE scintillator-tungsten HCAL is presented. Details of the data reconstruction and simulation as well as of the studies of systematic uncertainties are discussed. The resulting measurements of the calorimeter response to each particle type, as well as the energy resolution and detailed studies of the longitudinal and radial shower development, are presented. These results, of unprecedented detail, serve to validate and tune Geant4 simulation models for tungsten-based calorimetry. The data are therefore compared with several Geant4 simulation models.

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