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Energy Reconstruction in the CALICE Analog Calorimeter Systems in Analog and Digital Mode

Content :

Within the CALICE collaboration different Calorimeter technologies are studied for a future linear collider. These technologies differ in active material, granularity and readout systems. The Analog Hadronic Calorimeter (AHCAL) reads out the signal height of the energy deposition in each calorimeter cell, while the digital HCal detects hits by firing RPC pad sensors above a certain threshold. A 3 bit readout is provided by the semi-digital HCal, which counts hits above three different thresholds per cell. For these three options different energy reconstruction procedures are developed. The analog data can also provide digital information, thus the advantages and disadvantages of different energy reconstruction procedures can be studied.

In this work this comparison is done by applying these procedures to AHCAL beam test data collected with the 1m³ physics prototype at CERN. These studies are complemented by a full analog energy reconstruction using software compensation techniques to improve the energy resolution based on local energy density information, which is connected to the intrinsic sub-structure of hadronic showers. For these measurements, the full CALICE calorimeter system, with a silicon-tungsten ECal, and analog HCal and a tail catcher, is used.

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Comments :

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