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(G) Performance Analysis of the CALICE Digital Hadronic Calorimeter (DHCAL) for Pion Measurements.

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High-resolution, high-granularity calorimetry plays a crucial role in the advancement of modern particle detectors. These detectors are crucial for precise measurements across a broad spectrum of physics phenomena, including the potential detection of dark matter and supersymmetry particles. The CALICE international collaboration has developed scalable calorimeter prototypes to meet the demanding requirements of such detectors. One such prototype is the Digital Hadronic Calorimeter (DHCAL), optimized for event reconstruction using the Particle Flow algorithm. The cubic meter DHCAL, consisting of about 500000 of 1cm2 readout pads without absorber plates, has been tested at Fermilab. Thanks to its imaging capabilities, the DHCAL provides a powerful tool for detailed analysis of particle showers. In this study, I report on the performance analysis of the DHCAL specifically for pion measurements. Experimental data in the energy range of 1 to 10 GeV is utilized and will be compared with Monte Carlo simulations. This analysis comprises event selection, particle identification, and calibration procedures. The primary objective of my research is to enhance the performance of future detectors through a better understanding of hadronic showers with improved data reading speed, and significant cost reduction.

Keyword-1

Particle detectors

Keyword-2

Calorimetry

Keyword-3

pion

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