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Digital Hadron Calorimetry

Extreme spatial granularity is the key component for the full exploitation of Particle Flow Algorithms, which attempt to measure each particle in a hadronic jet individually. In this context, the CALICE Collaboration developed the Digital Hadron Calorimeter (DHCAL). The DHCAL uses Resistive Plate Chambers as active media and is read out with 1×1 cm^2 pads and digital (1-bit) resolution. In order to obtain a unique dataset of electromagnetic and hadronic interactions with unprecedented spatial resolution, the DHCAL went through a broad test beam program. In addition to conventional calorimetry, the DHCAL offers detailed measurements of event shapes, rigorous tests of simulation models and various analytical tools to improve calorimetric performance. Here we report on the results from the analysis of DHCAL data and comparisons with the Monte Carlo simulations across various test campaigns. We will also discuss the near future plans which include further tuning of the Monte Carlo parameters to improve the simulation of single particle response and electromagnetic interactions, and further tests of the hadronic interaction models.

Authors: BILKI, Burak (Beykent University (TR), The University of Iowa (US));   REPOND, Jose;   XIA, Lei (Argonne National Laboratory (US));   ONEL, Yasar (University of Iowa (US))

Presenter: BILKI, Burak (Beykent University (TR), The University of Iowa (US))