Contribution ID: **15** Type: **not specified**

Digital Hadron Calorimetry

Tuesday, 3 October 2017 09:00 (20 minutes)

Particle Flow Algorithms (PFAs) attempt to measure each particle in a hadronic jet individually, using the component or detector subsystem providing the best energy/momentum resolution. The application of PFAs has been shown to achieve energy resolutions of 3 –4% for hadronic jets produced in a future lepton collider. In this context the CALICE collaboration developed the Digital Hadron Calorimeter (DHCAL) which emphasizes granularity over single particle energy resolution. The large DHCAL prototype was built in 2008-2010, following the successful completion of the test beam program of a small size prototype.

The DHCAL uses Resistive Plate Chambers (RPCs) as active media and is read out with 1 x 1 cm2 pads and digital (1 - bit) resolution. A single layer of the DHCAL measures roughly 1 x 1 m2 and consists of 96 x 96 pads. 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. The DHCAL was tested with steel and tungsten absorber structures, as well as with no absorber structure, at the Fermilab and CERN test beam facilities over several years. In addition to conventional calorimetric measurements, the DHCAL offers detailed measurements of event shapes, rigorous tests of simulation models and various tools for improved performance due to its very high spatial granularity.

Here we report on the results from the analysis of pion and positron events, including the intricate calibration procedure. Results of comparisons with the Monte Carlo simulations are also discussed. The analysis demonstrates the unique utilization of detailed event topologies and the development of software compensation tools.

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

Session Classification: Prototypes, upgrades and concepts