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Design, Construction and Testing of the Digital Hadron Calorimeter

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Particle Flow Algorithms (PFAs) have been proposed as a method of improving the jet energy resolution of future colliding beam detectors. PFAs require calorimeters with high granularity to enable three-dimensional imaging of events. The Calorimeter for the Linear Collider Collaboration (CALICE) is developing and testing prototypes of such highly segmented calorimeters. In this context, a large prototype of a Digital Hadron Calorimeter (DHCAL) was developed and constructed by a group led by Argonne National Laboratory. The DHCAL consists of 51 layers, instrumented with Resistive Plate Chambers (RPCs) and interleaved with 2 cm thick steel absorber plates. The RPCs are read out by 1×1 cm² pads with a 1-bit resolution (digital readout). The DHCAL prototype counts approximately 470,000 readout channels. This talk reports on design, construction and commissioning of the DHCAL. An overview of the past and future DHCAL test beam campaigns at Fermilab's FTBF will also be presented.

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