

Digital Hadron Calorimeter: a novel approach to calorimetry

We report on the development of a novel approach to calorimetry: a digital hadron calorimeter with Resistive Plate Chambers (RPCs) as active media and extremely fine segmentation of the readout. The presentation will introduce the concept, summarize the extensive tests of a small scale prototype calorimeter in particle beams and with cosmic rays, and conclude with a status report of the construction and testing of a large size prototype. The latter features 40 active layers and approximately 400,000 individual readout channels. The results of the test beam activity have been published as four separate papers in JINST (see B.Bilki et al.). An additional paper describing the environmental dependencies of the performance of RPCs has recently been submitted to JINST.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

Additional information can be obtained from

http://www.hep.anl.gov/repond/DHCAL_US.html

Results from the test beam and measurements with Cosmic Rays have been published as

“Resistive Plate Chambers for Hadron Calorimetry: Tests with Analog Readout”, G.Drake et al., Nucl. Instr. Meth. A578, 88 (2007).

“Calibration of a Digital Hadron Calorimeter with Muons”,
B.Bilki et al., arXiv:0802.3398 [physics.ins-det]. 2008 JINST 3 P05001.

“Measurement of Positron Showers with a Digital Hadron Calorimeter”,
B.Bilki et al., arXiv:0902.1699 [physics.ins-det]. 2009 JINST 4 P04006.

“Hadron Showers in a Digital Hadron Calorimeter”,
B.Bilki et al., arXiv:0908.4236 [physics.ins-det]. 2009 JINST 4 P10008.

“Environmental Dependence of the Performance of Resistive Plate Chambers”,
B.Bilki et al., arXiv:0911.1351 [physics.ins-det]. Submitted to JINST.

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