

Abstract Submitted  
for the APR09 Meeting of  
The American Physical Society

**Advantages of Digital Calorimetry** EDWIN NORBECK, BURAK BILKI, YASAR ONEL, University of Iowa, DHCAL COLLABORATION — A sampling calorimeter has absorber plates interleaved with particle detectors. Good energy resolution requires a large sampling fraction and detectors with excellent energy resolution. However, for a minimum ionizing particle (MIP) the energy lost in an absorber plate and detector is known. In this case the detector needs only to indicate the passage of the particle, a “1” or a zero, hence the name “digital calorimeter.” The transverse position resolution must be good enough so that usually only one MIP hits a detector pixel. If a MIP interacts to produce several MIPs, a computer program will track the particles back to the vertex to determine the number of MIPs in pixels near the vertex. A single MIP may be on the edge between two pixels and register in both, or it may be below threshold and pass through a pixel without being recorded. Elaborate computer programs, including particle flow algorithms, are needed to extract the energy from the digital data. A calorimeter with a shape of a cubic meter is being constructed that will consist of 40 layers with 10,000 pixels in each detector, for a total of 400,000 single-bit channels. This is an “imaging” calorimeter that will measure jet energies better than is possible with a conventional analog calorimeter.

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Date submitted: 25 Feb 2009

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