

Abstract Submitted
for the 4CF11 Meeting of
The American Physical Society

Measuring Charge Collection Efficiency in Diamond Vertex Detectors BRIAN JOSEY, SALLY SEIDEL, MARTIN HOEFERKAMP, University of New Mexico — As currently used at the Large Hadron Collider, vertex detectors are composed primarily of silicon sensors that image particle tracks by detecting the creation of electron-hole pairs caused by the excitation of the silicon atoms. We are investigating replacing these silicon detectors with detectors made out of diamond. Diamond is advantageous due to its radiation hardness. We are measuring the charge collection efficiency of diamond as a function of fluence. We are building a characterization station. Diamond samples will be placed into the characterization station and exposed to a strontium-90 beta source, before and after I irradiate them with 800 MeV protons at LANL. The radiation from the Sr-90 source will create electron-hole pairs. These will be read out by applying an electric field across the sample. The system is triggered by a scintillator-photomultiplier tube assembly. The goal of this measurement is to record collected charge as a function of bias voltage. The diamond charge collection data will be compared to silicon and predictions about detector operation at the LHC will be made.

Brian Josey
University of New Mexico

Date submitted: 16 Sep 2011

Electronic form version 1.4