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CMS Silicon Pixel Detector Calibration

ABSTRACT

The Compact Muon Solenoid (CMS) pixel group at Cornell University is building a silicon pixel detector test station that will model the revolutionary detection and data acquisition system designed for the CMS experiment at the Large Hadron Collider (LHC) at CERN. When fully implemented at the LHC, the detector's sixty-six million pixels will be able to track and time passing charged particles that result from proton-proton collisions happening every twenty-five nanoseconds. With parts of the Cornell test station apparatus already functional, we have begun to understand and optimize the detector's programmable settings that tune its performance. The success of these optimizations has been quantified by performing various calibrations, also being developed here, that will also be used at the LHC to ensure that the pixel detector is working properly and taking the most accurate data possible.

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Benjamin is a fourth year physics major at CWRU. He has participated in particle physics research with the Cryogenic Dark Matter Search (CDMS) group at CWRU and the Compact Muon Solenoid (CMS) group at Cornell University. The latter of these projects was supported by the National Science Foundation's REU program and is the subject of this article.

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