

Application and performance of Geiger-mode APDs in the First G-APD Cherenkov Telescope (FACT)

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Content

The First G-APD Cherenkov Telescope (FACT) has been operating since October 2011. Its construction was a major step forward in establishing solid state photon counters as detectors in focal plane instrumentations. The camera is comprised of 1440 sensor arrays of Geiger-mode avalanche photo diodes (G-APD), equipped with solid light guides to increase the light collection area of each sensor. Methods were successfully developed to overcome the temperature dependence of the gain of these sensors and to correct for the voltage drop induced during moonlit nights increasing the duty cycle of such instruments significantly. The availability of this number of sensors allowed for a detailed study of the dependence of their properties on overvoltage and temperature. High statistics featured the study of optical crosstalk up to high multiplicities. With its outstanding gain stability and its high duty cycle, the telescope is ideally suited for monitoring of bright TeV blazars. A technical overview of this novel type camera and a summary of the achieved sensor performance will be presented.

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