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Study of photo-sensor candidates for the MEMSTEL project

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Abstract content

The MEMSTEL (Micro Electro Mechanical Systems Space Telescope) is a space based experiment being designed to investigate the origin of extreme energy cosmic-ray (EECR) particles above 5 x 10ˆ19 eV. The fluorescent light generated in extensive air showers (EAS) when EECRs hit the atmosphere can be detected from low Earth orbit. MEMSTEL will implement a novel idea of a tracking mirror based on semiconductor MEMS technology. The light signal will be focused on a relatively small area of readout photo-sensors using a tracking mirror. One candidate for MEMSTEL photo-sensors is the conventional multi- anode PMT. Recently, a new type of photo-sensor was developed for particle detector readouts - the silicon photo multiplier (Si-PM). This compact photo-sensor is comprised of a large array of micro-cells operating in a limited Geiger mode, and provides high gain (˜10ˆ6) with low operating voltage (˜50 V). The compact design, light weight and low power consumption make this device an excellent photon-detector candidate for space-based experiments. In this paper, we report on the comparative performance of a 2 x 2 mmˆ2 Si-PM, a conventional PMT, and a Hybrid Photo Diode (HPD) in lab tests, reading out light generated by Light Emitting Diodes (LED) as well as by scintillating fibers excited with a radioactive source.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 5 (HE part 2), pages 981-984

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