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SiSMUV: a modular UV detector for space telescopes using SiPM

The SiSMUV project aims to develop a compact, modular UV detector for space telescopes, leveraging Silicon Photomultipliers (SiPMs) to study fluorescence and Cherenkov signals from Ultra-High Energy Cosmic Rays and Very-High-Energy Neutrinos. The objective is to integrate state-of-the-art sensors and low-power readout electronics into a monolithic detector unit, enabling the construction of advanced focal surfaces for space telescopes. Each detector unit consists of a SiPM matrix, ASIC-based front-end electronics, and an FPGA as embedded intelligence. This integration significantly reduces power consumption and mass—critical factors for space missions.

This work presents the functional characterization of the prototype detector unit, using an integrating sphere and an LED to assess performance. Additionally, we evaluate its behavior in dark conditions, examining signal shape, gain, crosstalk, and afterpulsing. These studies help determine the photon detection efficiency and timing performance. The project showcases innovative advancements in SiPM technology and integrated read-out electronics, with potential applications in various scientific fields beyond astrophysics.

Collaboration(s)

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