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Towards the realization of a SiPM-based camera for the Schwarzschild-Couder Telescope proposed for the Cherenkov Telescope Array

The Italian Institute of Nuclear Physics (INFN) is involved in the development and construction of a Silicon Photomultiplier (SiPM) camera for the prototype of the Schwarzschild-Couder Telescope (pSCT) proposed for the Cherenkov Telescope Array (CTA).

SiPMs are particularly suitable to detect the fast and low-intensity Cherenkov light emitted in the atmosphere. Fondazione Bruno Kessler (FBK) has produced photosensors optimized for the detection of Cherenkov light in the Near-Ultraviolet spectral range (NUV SiPMs). After a deep characterization and study of these devices, the third generation of high-density NUV SiPMs (NUV-HD3) was chosen to equip a part of the camera of the pSCT. Each sensor is based on a 40 um x 40 um micro cell and has an area of 6 mm x 6 mm, providing high gain and excellent photo-detection efficiency (PDE) in the NUV wavelengths. SiPMs have been arranged in 4x4 sensor matrices, which will be used to equip a sector of the pSCT camera. For this purpose, 40 matrices have been built and tested. Here we present the results of the preliminary tests made on these matrices adopting an ad-hoc 16-channel read-out electronics. The performances and homogeneity in terms of gain and signal-to-noise ratio will be highlighted.

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