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Performance of the FBK NUV HD technology for the realization of a camera prototype based on Silicon Photomultipliers for the Cerenkov Telescope Array project

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The Cerenkov Telescope Array (CTA) is a new generation observatory of ground telescopes for high energy gamma ray astronomy. The Italian Institute of Nuclear Physics (INFN) together with the Fondazione Bruno Kessler (FBK) is carrying out an intensive R&D program to develop possible solutions for the Cherenkov photon cameras based on Silicon Photomultiplier (SiPM) devices at the near ultraviolet frequencies. SiPM technology is becoming very attractive in the fields of high energy and astroparticle physics thanks to the high Photon Detection Efficiency (PDE) and the price per mm² of detector area. The sensors produced by FBK are different generations of NUV High-Density (NUV-HD) SiPMs grown on different substrates, based on a microcell of 40 μm \times 40 μm and an area of 6 mm \times 6 mm. A full characterization of the single devices will be reported in terms of gain, dark rate, cross talk and PDE in order to determine the best choice to arrange the optical modules (each made of a matrix of 4x4 SiPMs) that integrated with the readout electronics will be installed in the focal plane camera of the prototype of the Schwarzschild-Couder Telescope (pSCT). An update on the recent quality tests and performance of the detectors arranged in this matrix configuration will be also given.

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