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The First G-APD Cherenkov Telescope for ground-based gamma-ray astronomy

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The First G-APD Cherenkov Telescope (FACT) project aims to prove that newly developed Geiger-mode avalanche photo-diodes (G-APD) are a viable alternative to widely used vacuum photomultipliers tubes (PMT) for future Cherenkov telescopes for ground-based gamma-ray astronomy.
Compared to PMTs, G-APDs (also called SiPM or MPPC) are much more compact, need a low bias voltage, are less fragile to handle and bear the potential of higher sensitivity and lower costs. On the other hand, G-APDs are not one-to-one replacements for PMTs and there is a lack of experience of operating such novel devices, especially in the harsh environment of Cherenkov Telescopes.
Currently, March 2011, we are assembling a novel camera based on 1440 G-APDs coupled to specially designed solid light-concentrators to increase the active area and restrict the angular acceptance to just the mirror size. The data-acquisition is based on the Domino Ring Sampler chip (DRS-4 running at 2 GHz sampling frequency) and an Ethernet based readout system. The complete camera is undergoing extensive tests in the laboratory, and it is planned to install it in a refurbished HEGRA telescope at the Canary Island La Palma this summer.
In this talk I will describe the camera design, the outcome of the tests and the experience gained so far.

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