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An ASIC Front-End for Fluorescence and Cherenkov light detection with SiPM for space applications.

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Astroparticle and High Energy Astrophysics space missions measuring extensive air showers produced by cosmic rays and neutrinos in atmosphere require detection of very faint and intense UV-VIS light. Characteristics of the new generation of SiPM (Silicon PhotoMultiplier) are potentially right for this purpose. Their high intrinsic gain, low power consumption, low weight and robustness against accidental exposure to light are particularly important for spaceborn multipixels imaging cameras. Their high-performance detection makes them promising for photon counting, where extreme photodetector sensitivity is needed, as well as for charge integration, where the total amount of charge in the signal is required. The capability to operate SiPM contemporarily in photon counting and in charge integration is strictly dependent indeed by the design of the front-end electronics. In this context, the challenge is to find the right balance and a feasible solution for managing SiPM with a front-end electronics to be able to work, contemporarily and efficiently, in photon counting and charge integration.

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