

Front End Electronics Module Design for the Schwarzschild-Couder Telescope (SCT) Camera

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The SCT telescope has been proposed as a medium-sized telescope for the Cherenkov Telescope Array. One of the major upgrades is to fully equip the telescope camera with improved SiPM sensors and a new Front End Electronics Module (FEEM). The new FEEMs aim to read-out and digitize the SiPM pre-amplified signals down to the single photoelectron (phe). This phe signal is assumed equivalent to a signal with 2 mV peak amplitude and 500 MHz maximum bandwidth. The FEEM should have a linear response up to 2 V for a required dynamic range of 1000 phe. A noise equivalent of 0.5 phe is an acceptable value. Due to the severe mechanical constraints to have a compact electronics and low noise performances, the FEEM consists of two stacked-up submodules, one dedicated to the power supplies and the other to house the FPGA which reads-out and send digitized data to the main backplane. The new FEEM is capable of digitizing 64 analog channels with a sampling frequency of 1 GSamples/s.

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