

11th International Workshop on Ring Imaging Cherenkov Detectors (RICH2022)



Contribution ID: 48

Type: **presentation**

The Silicon Photomultiplier-based Camera for the Cherenkov Telescope Array Small-Sized Telescopes

Tuesday 13 September 2022 12:00 (25 minutes)

The Cherenkov Telescope Array (CTA) is the next generation ground-based gamma-ray astronomy observatory, planned to comprise two arrays of imaging air Cherenkov telescopes (IACTs) located in the northern and southern hemispheres. Three telescope sizes are required to cover the CTA gamma-ray energy range from 20 GeV to 300 TeV.

An array of several tens of Small-Sized Telescopes (SSTs) at the southern site situated in the Andes at Paranal in Chile, will provide unprecedented sensitivity above 1 TeV and up to 300 TeV, and offer the highest angular resolution of any instrument at these energies. Following a down selection from three prototype telescopes, the design finally selected for SST comprises a dual mirror Schwarzschild-Couder optic with a 4.3 m diameter primary mirror and a 1.8 m secondary mirror imaged by a SiPM-based camera with a $\sim 9^\circ$ field of view. The dual mirror optics produces a smaller plate-scale aplanatic focal plane allowing a small, low-cost camera to be employed, compared to that required for the conventional single mirror Davies-Cotton IACT design.

The camera comprises an array of 2048 SiPM pixels, configured as 32 sensor and electronics modules each with an 8×8 pixel² tile populated with 6×6 mm² SiPM pixels. Full waveform capture on every channel is provided by the TARGET ASIC which performs the dual function of event triggering and waveform digitization of the full camera at 1 GSample/s.

We describe the finalized SST camera design including its optimization for the production phase of the project anticipated to begin in 2023.

Author: LAPINGTON, Jon

Presenter: LAPINGTON, Jon

Session Classification: Cherenkov detectors in astroparticle physics

Track Classification: Cherenkov light imaging in neutrino and astroparticle physics experiments