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Silicon Photomultiplier Camera for Schwarzschild-Couder Cherenkov Telescopes

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The Cherenkov Telescope Array (CTA) is an atmospheric Cherenkov observatory that will image the cosmos in very-high-energy gamma rays. CTA will study the highest-energy particle accelerators in the Universe and potentially confirm the particle nature of dark matter. We have designed an innovative Schwarzschild-Couder telescope which uses two mirrors to achieve excellent optical performance across a wide field of view. The small plate scale of the dual-mirror optics enables a compact camera which uses modern technology including silicon photomultipliers and the TARGET application-specific integrated circuit to read out a finely pixelated focal plane of 11,328 channels with modest weight, volume, cost, and power consumption. The camera design is hierarchical and modular at each level, enabling robust construction, operation, and maintenance. A prototype telescope is under construction and will be commissioned at the VERITAS site in Arizona. An array of such telescopes will provide excellent angular resolution and sensitivity in the core energy range of CTA, from 100 GeV to several TeV.

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