The Track Imaging Cerenkov Experiment

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Abstract

We describe a dedicated cosmic-ray telescope that explores a new method for detecting Cerenkov radiation from high-energy primary cosmic rays and the large particle air shower they induce upon entering the atmosphere. Using a camera comprising 16 multi-anode photomultiplier tubes for a total of 256 pixels, the Track Imaging Cerenkov Experiment (TrICE) resolves substructures in particle air showers with 0.086° resolution. Cerenkov radiation is imaged using a novel two-part optical system in which a Fresnel lens provides a wide-field optical trigger and a mirror system collects delayed light with four times the magnification. TrICE records well-resolved cosmic-ray air showers at rates ranging between 0.01-0.1 Hz.

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