

Monte Carlo Studies of the first VERITAS telescope

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Abstract: The Very High Energy Radiation Telescope Array (VERITAS) is a system of four imaging Cherenkov telescopes currently under construction at Kitt Peak, Arizona, USA. The first telescope has been in operation at the Mt. Hopkins basecamp since January 2005. We present here detailed Monte Carlo simulations of the telescope response to extensive air showers. The energy threshold for this stand-alone telescope is calculated to be 150 GeV at trigger level, the gamma-ray trigger rate is 22 gamma's/min. Image parameter distributions, and the quality of gamma-hadron discrimination are calculated and show good agreement with distributions from observations of background cosmic rays and high-energy gamma-rays from the Crab Nebula and Markarian 421. The energy spectrum of the Crab is reconstructed as $(3.26 \pm 0.9) \cdot 10^{-7} \cdot E^{-(2.6 \pm 0.3)} \text{ m}^{-2} \text{ s}^{-1} \text{ TeV}^{-1}$.