

# Analysis of Flash ADC Data With VERITAS

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Abstract: VERITAS employs a 12m segmented mirror and pixellated photomultiplier tube camera to detect the brief pulse of Cherenkov radiation produced by the extensive air shower initiated by a cosmic high-energy gamma ray. The VERITAS data acquisition system consists of a 500 Mega-Sample-Per-Second custom-built flash ADC system, which samples the Cherenkov light pulse every 2 nanoseconds. The integrated charge in each flash ADC channel is proportional to the amount of Cherenkov light incident on the corresponding photomultiplier tube. Accurate reconstruction of the integrated charge is required for accurate energy estimation and spectral reconstruction. A reliable calculation of the integrated charge at low intensities can lead to a reduction in the energy threshold of the system, and an increase in sensitivity. This paper investigates and compares several approaches for evaluating the integrated charge. The Cherenkov pulse timing information in the flash ADC readout has the potential to assist in background rejection techniques. Various methods for extracting the timing information are investigated and excellent timing resolution is achieved.