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Synchronous digitization of incident pulses across 1088-pixel Camera of MACE Telescope

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In Imaging Atmospheric Cherenkov Telescopes like MACE, Synchronous digitization of 1088-input channels of Camera Electronics is of paramount importance. These PMT based pixels of Camera have been incorporated in 68 modules called Camera Integrated Module (CIM), each catering to 16 pixels. Each module acquires, processes and transfers data independently of other modules. To reduce the data volume, Charge accumulated in each pixel is calculated in Camera itself. Profile data is sent only for the pixels above threshold. Hence it is important to align the recorded pulse profiles with minimum possible jitter. SCA based Analog memory ASIC DRS4 is used for sampling at 1 GSPS. CIMs start event acquisition on receipt of global Trigger signal. This signal is applied to the 9th Input channel of each of the DRS4 IC. Detection of Pulse profile region is based on detection of trigger signal in DRS4 IC. Various factors like inherent jitters of DRS4 IC, trigger generation jitter and different HV to PMTs add to the uncertainties in the timing of recorded pulses. Data Processing algorithms have been implemented in FPGA to correct for these uncertainties in real time and record the incident pulses with reduced jitter. Camera Electronics of MACE Telescope has been installed and Integrated Camera Trial runs are being carried out. This paper presents the details of implemented scheme for low jitter event acquisition and initial results observed during the trial run with a focus on jitter in recorded pulses across the camera during LED_Calibration scheme.

Minioral

Yes

IEEE Member

No

Are you a student?

No

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