



Contribution ID: 780

Type: Poster

Performance Results of the first version of the MIZAR ASIC for the PBR mission

The Multi-channel Integrated Zone-sampling Analogue-memory based Readout (MIZAR) ASIC is a new type of front-end electronics which has been developed for the detection of the optical Cherenkov signals by Extensive Air Showers directly observed from sub-orbital and orbital altitudes. It sets the stage for a new generation of low-power consuming 64-channel Application-Specific Integrated Circuit (ASIC). The ASIC is implemented in a commercial 65 nm CMOS technology to readout an 8x8 matrix of Silicon Photo-Multipliers (SiPMs). An event is recorded at channel level in an array of 256 cells, each one equipped with an analogue memory, a 12-bits Wilkinson Analog-to-Digital Converter (ADC) and latches running at a sampling rate of 200 MS/s. The converted data are sent off-chip to an FPGA which controls the digital end-of-column logic of the ASIC and implements the trigger logic. The goal is to employ it for the first time on the POEMMA Balloon with Radio (PBR) NASA mission which is devoted to measure Ultra-High Energy Cosmic Rays and perform neutrino astronomy from stratospheric altitudes through the detection of atmospheric Cherenkov light. The first version of the MIZAR ASIC has been sent to production in December 2024 and it is expected to be ready for testing at the end of March 2025. In this contribution we will present preliminary results of the characterization of the chip.

Collaboration(s)

JEM-EUSO collaboration

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Session Classification: PO-1

Track Classification: Cosmic-Ray Indirect