

A Novel High Rate Readout System for a High Efficiency Cosmic Ray Veto for the Mu2e Experiment

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The Mu2e Cosmic Ray Veto must veto cosmic-ray muons over a large area with an efficiency of 99.99% in the presence of high background rates. It consists of 5,376 scintillator extrusions with embedded 1.4 mm wavelength-shifting fibers coupled to 2×2 mm² silicon photomultipliers. A custom readout system consists of: (1) small circuit board, the Counter Mother Board, which provides the bias, a temperature sensor, flasher LEDs, and passive SiPM pulse shaping; (2) a Front End Board which digitizes, zero-suppresses, and stores in on-board memory signals from up to 64 Counter Mother Boards, provides bias to the SiPMs, pulses to the LEDs, and a measurement of the SiPM currents; and (3) a Readout Controller which collects data from the Front End Boards via Cat6 cables, which also deliver 48V power to the Front End Boards using PoE.

TIPP2020 abstract resubmission?

Yes, this would have been presented at TIPP2020.

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Primary author: CORRODI, Simon (Fermi National Accelerator Laboratory)

Co-author: DUKES, Edmond

Presenter: CORRODI, Simon (Fermi National Accelerator Laboratory)

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