



Contribution ID: 87

Type: Oral

CMS High Granularity Calorimeter ECON-D ASIC overview and radiation testing results

Tuesday, 7 November 2023 14:15 (15 minutes)

The Compact Muon Solenoid (CMS) Experiment's High Granularity Calorimeter (HGCal) upgrade replaces the CMS electromagnetic and hadronic endcap calorimeters in preparation for the high-rate and high-radiation environment of the High Luminosity LHC. To effectively use the over 6 million channels of this highly-segmented "imaging" calorimeter, CMS is pioneering very front-end data compression with the Endcap Concentrator (ECON) ASICs –the ECON-T for the trigger path and the ECON-D for the data path. These 65 nm CMOS ASICs are radiation tolerant (200 Mrad) and low-power (< 2.5 mW/channel). In June 2023, we received the first full-functionality prototype of the data path concentrator ASIC, the ECON-D-P1. This talk will present an overview of the ECON-D-P1, summarize functionality and system testing, and present results from both Total Ionizing Dose (TID) and Single Event Effect (SEE) testing campaigns completed in summer 2023, validating the ECON-D radiation tolerant performance.

Early Career

Yes

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Session Classification: RDC4

Track Classification: RDC Parallel Sessions: RDC4: Readout and ASICs