

HGCROC: the front-end readout ASIC for the CMS High Granularity Calorimeter

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The CMS High-Granularity Calorimeter (HGCAL) imposes extremely challenging specifications for the front-end electronics: high dynamic range, low noise, high-precision time information and low power consumption, as well as the need to select and transmit trigger information with a high transverse and longitudinal granularity. HGCROC-V2 has 72 channels of the full analog chain: low noise and high gain preamplifier and shapers, and a 10-bit 40 MHz SAR-ADC, which provides the charge measurement over the linear range of the preamplifier. In the saturation range of the preamplifier, a discriminator and TDC provide the charge information from TOT (200 ns dynamic range and 50 ps binning). A fast discriminator and TDC provide timing information to 25 ps accuracy. We will report on the performance in terms of noise, charge and timing, the DAQ and Trigger paths, as well as results from radiation qualification with total ionizing dose (TID) and heavy ions for single-event effects (SEE).

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Yes, this would have been presented at TIPP2020.

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