

Electronics and Triggering Challenges for the CMS High-Granularity Calorimeter

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The High Granularity Calorimeter (HGCAL), presently being designed by the CMS collaboration to replace the CMS endcap calorimeters for the High Luminosity phase of LHC, will feature six million channels. The requirements for the front-end electronics are extremely challenging, including high dynamic range (0-10 pC), low noise ($\sim 2000e^-$ to be able to calibrate on single MIP throughout the detector lifetime), high accuracy time information in order to mitigate the pileup effect (25 ps binning) and low power consumption ($\sim 15\text{mW/channel}$), as well as the need to select and transmit trigger information with a high granularity. The front-end electronics will face a harsh radiation environment, reaching up to 200 Mrad at the end of life. About 1/6 of the channels will form part of the CMS Level 1 trigger and, together with tracking information, should allow particle-flow techniques to be used as part of this trigger.

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