

The front-end data conversion and readout electronics for the CMS ECAL upgrade

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The High Luminosity LHC (HL-LHC) will require a significant upgrade of the readout electronics for the CMS Electromagnetic Calorimeter (ECAL). The Very Front-End (VFE) output signal will be sampled at 160 MS/s (i.e. four times the current sampling rate) with a 13 bits resolution. Therefore, a high-speed, high-resolution ADC is required. Moreover, each readout channel will produce 2.08 Gb/s, thus requiring a fast data transmission circuitry.

A new readout architecture, based on two 12 bit, 160 MS/s ADCs, lossless data compression algorithms and fast serial links has been developed for the ECAL upgrade. These functions will be integrated in a single ASIC which is currently under design in a commercial CMOS 65 nm technology using radiation damage mitigation techniques.

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