

CMS ECAL upgrade for precision timing and energy measurements at the High-Luminosity LHC

Monday 25 May 2020 14:54 (18 minutes)

A dual gain trans-impedance amplifier and an ASIC providing two 160 MHz ADC channels, gain selection, and data compression will be installed. The noise increase in the APDs, due to radiation-induced dark current, will be contained by reducing the temperature at which ECAL is operated. The trigger decision will be moved off-detector and performed by powerful and flexible FPGA processors, allowing for more sophisticated trigger algorithms to be applied.

The upgraded ECAL will be capable of high-precision energy measurements and will greatly improve the time resolution for photons and electrons above 10 GeV. Together with the introduction of a new timing detector designed to perform timing measurements with the resolution of a few tens of picoseconds for minimum ionizing particles, the CMS detector will be able to precisely reconstruct the primary interaction vertex under the described pile up conditions.

Funding information

Authors: MARTINEZ RIVERO, Celso (CSIC - Consejo Sup. de Investig. Cientif. (ES)); REIS, Thomas (Science and Technology Facilities Council STFC (GB))

Presenter: REIS, Thomas (Science and Technology Facilities Council STFC (GB))

Session Classification: Experiments: Calorimeters

Track Classification: Experiments: Calorimeters