



Contribution ID: 247

Type: **Poster Presentation**

## Study of a solution with COTS for the LHCb calorimeter upgrade

Since the end of the commissioning of LHCb in 2009 the detector has proven to work nicely even in high pile-up conditions and by the end of 2010 nominal instantaneous luminosity was reached. Data taking is expected to continue for 5 more years, aiming to accumulate an integrated luminosity of 5fb<sup>-1</sup>. Even if new physics is discovered at that time, it will be difficult to characterize it and it would be more profitable to upgrade the detector. The foreseen long shutdown offers an opportunity to upgrade the detector .

As expressed in the Letter of Intent for the LHCb upgrade [1] the main objective of this enhancement is to have a 40MHz readout electronics to allow the use of a more flexible and efficient software-based triggering system. Moreover, after the shutdown, the instantaneous luminosity at the LHCb interaction point is expected to be multiplied by 5. From the point of view of the LHCb calorimeter changing the readout implies a change of the electronic boards. Also because of the luminosity increase and in order to preserve the photomultiplier's life expectancy, its gain will be reduced by a factor of 5. This has to be compensated in the front-end electronics, imposing new constraints in the performance of input analog electronics. New analog and digital electronics are being developed to solve these problems. In the analog part ASIC and Commercial Off The Shelf (COTS) solutions are under study. A suitable COTS design needs amplification before analog processing, forcing the clipping to be done in the front-end cards. A compact solution with differential amplifiers and delay lines will be shown as well as the status of prototypes and some results.

[1] LHCb Collaboration, Letter of Intent for the LHCb Upgrade, CERN-LHCC-2011-001 ; LHCC-I-018; CERN (2011)

**Author:** ABELLAN BETETAN, Carlos (LIFAELS, La Salle, Universitat Ramon Llull, Barcelona (Spain))

**Presenter:** ABELLAN BETETAN, Carlos (LIFAELS, La Salle, Universitat Ramon Llull, Barcelona (Spain))

**Track Classification:** Front-end Electronics