Contribution ID: **41**   Type: **not specified**

Concepts and design of the CMS High Granularity Calorimeter Level 1 Trigger

Thursday, 28 November 2019 10:00 (20 minutes)

The CMS collaboration has chosen a novel high granularity calorimeter for the endcap regions as part of its planned upgrade for the high luminosity LHC. The calorimeter will have fine segmentation in both the transverse and longitudinal directions and will be the first such calorimeter specifically optimised for particle flow reconstruction to operate at a colliding-beam experiment. The calorimeter data will form part of the Level 1 trigger of the CMS experiment and, together with tracking information that will also be available at this level, should allow particle-flow techniques to be used as part of this trigger. The trigger has tight contraints on latency and rate and will need to be implemented in hardware. The high granularity results in around six million readout channels in total, a million of which are also used as part of the Level 1 trigger, presenting a significant challenge in terms of data manipulation and processing for the trigger system; the trigger data volumes will be an order of magnitude above those currently handled at CMS. In addition, the high luminosity will result in an average of 140 (or more) interactions per bunch crossing that give a huge background rate in the forward region and these will need to be efficiently rejected by the trigger algorithms. Furthermore, reconstruction of the particle clusters to be used for particle flow in events with high hit rates is also a complex computational problem for the trigger. The status of the trigger architecture and design, as well as the concepts for the algorithms needed in order to tackle these major issues, will be presented.

Primary author: AHUJA, Sudha (Centre National de la Recherche Scientifique (FR))

Presenter: AHUJA, Sudha (Centre National de la Recherche Scientifique (FR))

Session Classification: Electronics, DAQ