



Contribution ID: 136

Type: Poster

Upgrade of the CMS Global Muon Trigger

The increase in center-of-mass energy and luminosity for Run 2 of the Large Hadron Collider pose new challenges for the trigger systems of the experiments. To keep triggering with a similar performance as in Run 1, the CMS muon trigger is currently being upgraded. The new algorithms will provide higher resolution, especially for the muon transverse momentum and will make use of isolation criteria that combine calorimeter with muon information already in the level-1 trigger. The demands of the new algorithms can only be met by upgrading the level-1 trigger system to new powerful FPGAs with high bandwidth I/O. The processing boards will be based on the new microTCA standard. We report on the planned algorithms for the upgraded Global Muon Trigger (GMT) which combines information from the muon trigger sub-systems and assigns the isolation variable. The upgraded GMT will be implemented using a Master Processor 7 card, built by Imperial College, that features a large Xilinx Virtex 7 FPGA. Up to 72 optical links at 10 Gb/s will be used to receive energy sums from the calorimeter trigger and muon candidates directly from the sector processors of the upgraded trigger, absorbing the final sorting stage of each muon sub-system and thus minimizing the latency of the trigger.

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Track Classification: Data-processing: 3b) Trigger and Data Acquisition Systems