Contribution ID: **321**   Type: **poster**

Implementation of Level-1 trigger algorithms on the upgraded CMS Global Trigger System

The Global Trigger is the final step of the CMS Level-1 Trigger and implements a trigger menu, a set of selection requirements applied to the final list of objects from calorimeter and muon triggers. The conditions for trigger object selection including topological requirements on multi-object triggers, invariant-mass calculations and other complex operations are combined by simple combinatorial logic to form the algorithms.

To improve the performance of the Level-1 trigger system at high luminosity with large numbers of pile-up events expected at LHC Run 2, the electronics for the calorimeter, muon and Global Trigger systems will be replaced. The upgraded system will be flexible for implementing further rate reduction and efficiency improvements as algorithms improve. The flexibility will be accomplished by using high bandwidth optical links for most of the data communication between trigger cards, and by using modern, large FPGAs and large memory resources for the trigger logic.

In order to handle the increased complexity of the trigger menu implemented on the upgraded Global Trigger as well as to make the menu implementation more flexible, a set of rules has been defined to express Level-1 algorithms. The system to realise the trigger menu on FPGA from Level-1 trigger algorithms expression based on the rules has been developed. The design and implementation of the system for preparing a menu for the upgraded CMS Global Trigger system will be presented.

Author: ARNOLD, Bernhard (Austrian Academy of Sciences (AT))

Presenter: ARNOLD, Bernhard (Austrian Academy of Sciences (AT))

Track Classification: Detector R&D and Data Handling