Contribution ID: **49**   Type: **Oral Contribution**

Performance of the ATLAS RPC detector and L1 Muon Barrel trigger at $\sqrt{s} = 13$ TeV

Monday, 10 February 2020 14:20 (20 minutes)

The ATLAS experiment at the Large Hadron Collider utilises a trigger system consisting of a first level hardware trigger and a higher level software trigger. The Level-1 muon trigger system selects muon candidates with six transverse momentum thresholds and associate them with a correct LHC bunch crossing. The Level-1 Muon Barrel Trigger uses Resistive Plate Chambers (RPC) detectors to generate trigger signals for selecting muon candidates within the pseudorapidity range of up to 1.05. The RPC detectors are arranged in three concentric double layers and consist of 3700 gas volumes, with a total surface of more than 4000 square meters, that operate in a toroidal magnetic field. This contribution will discuss the performance of the RPC detector system and of the Level-1 Muon Barrel trigger during the 2018 data taking period. Measurements of the RPC detector response and time resolution, obtained using muon candidates produced in LHC collisions, will be presented. Trigger performance and efficiency measurements that are obtained using Z boson decays to a muon pair will be also discussed. Finally, studies of the RPC detector response at different high voltage and threshold settings will be presented, in the context of expected detector response after the High Luminosity LHC upgrades.

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Session Classification: Large systems and Upgrades