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Development of new offline analysis for the monitoring of RPC detector at the ATLAS experiment parameters during LHC Run3

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The ATLAS experiment at the LHC consists of several sub-detectors for triggering on particle candidates. The Level-1 muon trigger system uses Resistive Plate Chamber (RPC) detectors to identify muon trigger candidates in the barrel detector region. The ATLAS RPCs are arranged in three concentric double layers and consist of around 3700 gas volumes, with a total surface of more than 4000 square meters. Diverse sources of information regarding the RPC detector state are continuously monitored in real-time using the Detector Control System (DCS). The DCS monitors RPC temperature, currents and gas flow parameters, as well high voltage and threshold settings. This information is archived and accessible for offline analysis. This contribution will first summarise measurements of RPC performance in 2018 that were published since the previous workshop. Then it will discuss new offline analysis procedures that are being developed for automatic monitoring of RPC detector parameters during Run 3. These procedures analyse RPC currents as a function of instantaneous luminosity, temperature, and pressure, in order to monitor RPC conditions during Run 3 operations. These procedures were applied to analyse archived DCS data from 2018 in order to identify RPCs with unusual response, for example due to a developing gas leak. Preliminary results for 2018 data and for new Run 3 collision data will be presented.

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