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Performances of the ATLAS RPC Level-1 Muon trigger during the Run-II data taking

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The Level-1 Muon Barrel Trigger is one of the main elements of the event selection of the ATLAS experiment at the Large Hadron Collider.
Its input stage consists of an array of processors receiving the full granularity of data from Resistive Plate Chambers in the central area of the ATLAS detector (”Barrel”).
The RPCs, placed in the barrel region of the ATLAS detector, are arranged in three concentric double layers and operate in a strong magnetic toroidal field.
RPC detectors cover the pseudo-rapidity range $|\eta|<1.05$ for a total surface of more than 4000 m2 and about 3600 gas volumes.

The Level-1 Muon Trigger in the barrel region allows to select muon candidates with respect to their transverse momentum and associates them with the correct bunch-crossing number.
The trigger system is able to take a decision within a latency of about 2 μs.
We illustrate the selections, strategy and validation for an unbiased determination of the efficiency and timing of the RPC and the L1 from data; and show the results we obtain and that are fed back into the ATLAS simulation to model real data.

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