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The ATLAS Trigger: Commissioning with cosmic-rays

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The ATLAS detector at CERN's LHC will be exposed to proton-proton collisions from beams crossing at 40 MHz. At the design luminosity there are roughly 23 collisions per bunch crossing. ATLAS has designed a three-level trigger system to select potentially interesting events. The first-level trigger, implemented in custom-built electronics, reduces the incoming rate to less than 100 kHz with a total latency of less than $2.5\mu\text{s}$. The next two trigger levels run in software on commercial PC farms. They reduce the output rate to 100-200 Hz.

In preparation for collision data-taking which is scheduled to commence in November 2007, several cosmic-ray commissioning runs have been performed. Among the first sub-detectors available for commissioning runs are parts of the barrel muon detector including the RPC detectors that are used in the first-level trigger. Data have been taken with a full slice of the muon trigger and readout chain, from the detectors in one sector of the RPC system, to the second-level trigger algorithms and the data-acquisition system. The system is being prepared to include the inner-tracking detector in the readout and second-level trigger.

We will present the status and results of these cosmic-ray based commissioning activities. This work will prove to be invaluable not only during the commissioning phase but also for cosmic-ray data-taking during the normal running for detector performance studies.

Submitted on behalf of Collaboration (ex, BaBar, ATLAS)

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