

Upgrade of the ATLAS Muon Drift Tube (MDT) electronics for HL-LHC runs

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The ATLAS monitored drift tube (MDT) chambers are the main component of the precision tracking system in the ATLAS muon spectrometer. The MDT system is capable of measuring the sagitta of muon tracks to an accuracy of 60 μm , which corresponds to a momentum accuracy of about 10% at $p_T=1$ TeV. To cope with large amount of data and high event rate expected from the High-Luminosity LHC (HL-LHC) upgrade, ATLAS plans to use the MDT detector at the first-trigger level to improve the muon transverse momentum resolution and reduce the trigger rate. The new MDT trigger and readout system will have an output event rate of 1 MHz and a latency of 6 μs at the first-level trigger. A new trigger and readout system has been proposed. Prototypes for two frontend ASICs and a data transmission board have been designed and tested, and detailed simulation of the trigger latency has been performed. We will present the overall design of the trigger and readout system and focus on latest results from different ASIC and board prototypes and system integration.

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