

Upgrade of the ATLAS Muon Spectrometer with high-resolution Drift Tube Chambers (sMDT) for LHC Run-3

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The Monitored Drift Tube detector technology is used in the ATLAS experiment for the very accurate, reliable muon tracking and momentum measurements in the barrel and endcap regions. Already in Run 2 of the LHC they had to cope with very high background counting rates up to 500 Hz/cm^2 in the inner endcap layer. At High-Luminosity LHC, the background rates are expected to increase by almost a factor of 10. New small (15 mm) diameter Muon Drift Tube detectors have been developed in the Max Planck Institute for Physics in Munich for the upcoming upgrade of the ATLAS muon spectrometer. New chambers will provide about an order of magnitude higher rate capability and allow for the installation of additional thin gap RPC trigger technology in the transition region ($1.0 < |\eta| < 1.3$) of the ATLAS muon system for HL-LHC runs. A smaller size project, known as BIS78 (Barrel Inner Small sectors), is developed with a foreseen installation during the LHC Long Shutdown 2 (2019-2021). This pilot project will reinforce the fake muon rejection and the selectivity of the muon trigger in the problematic transition region by adding new BIS78 muon stations which are composed of 16 sMDT chambers with 32 RPC triplets (BIS7 and BIS8). In this contribution, we will describe the new BIS78 sMDT detector design, the quality assurance and certification path, as well as will present the overview of the chamber's validation and installation, their cavern commissioning status and performance in the ATLAS combined runs during Milestone weeks.

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