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Commissioning of the new small-diameter Monitored Drift Tube detectors for the phase-1 upgrade of the ATLAS muon spectrometer.

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The Muon Drift Tube (MDT) chambers provide very precise and reliable muon tracking and momentum measurement in the ATLAS muon spectrometer. Already in Run 2 of the LHC they have to cope with very high background counting rates up to $500 Hz/cm^2$ in the inner endcap layers. At High-Luminosity LHC (HL-LHC), the background rates are expected to increase by almost a factor of 10. New small (15 mm)-diameter Muon Drift Tube (so-called sMDT) detectors have been developed for upgrades of the muon spectrometer. They provide an about an order of magnitude higher rate capability and allow for the installation of additional new triple-RPC trigger chambers in the barrel inner layer of the muon detector for HL-LHC. They have been designed for mass production at the Max Planck Institute (MPI) for Physics in Munich and achieve a sense of wire positioning accuracy of 5 microns. A pilot project for the barrel inner layer upgrade is underway during the 2019/20 LHC shutdown. Several sMDT chambers have already been installed and operated in the ATLAS detector. The detailed studies of the muon detection efficiency and muon track resolution have been carried out after the assembling of the sMDT detectors in MPI and repeated at CERN after the integration with the new tRPC detectors. The author will describe the detector design, the quality assurance and certification path, as well as will present the status of the installation and commissioning, worth its preliminary results and an overview for the complete integration of the sMDT project In the ATLAS experiment.

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