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Implementation of chamber mis-alignments and deformations in the ATLAS Muon Spectrometer description and estimate of the muon reconstruction performance reconstruction performance

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The Atlas Muon Spectrometer is designed to reach a very high transverse momentum resolution for muons in a pT range extending from 6 GeV/c up to 1 Tev/c. The most demanding design goal is an overall uncertainty of 50 microns on the sagitta of a muon with pT = 1 TeV/c. Such precision requires an accurate control of the positions of the muon detectors and of their movements during the experiment operation. Moreover, the light structure of the Muon Spectrometer, consisting mainly of drift tubes assembled in three layers of stations, imply sizable distortions of the nominal layout of individual chambers, due to mechanical stress and thermal gradients. Corrections for mis-alignments and deformations, which will be provided run-time by an optical alignment system, must be integrated in the software chain leading to track reconstruction and momentum measurement.
Here we discuss the implementation of run-time dependent corrections for alignment and distortions in the detector description of the Muon Spectrometer along with the strategies for studying such effects in dedicated simulations. Some preliminary results obtained in the context
of the ATLAS Condition Data Challenge effort are also presented.

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