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Reconstruction and identification of high- p_T muons in $\sqrt{s} = 13$ TeV proton-proton collisions with the ATLAS detector

The ability to reconstruct almost-straight tracks with good momentum resolution is closely tied to maintaining a good understanding of the ATLAS tracking detectors' alignment and the related uncertainties. Moreover, an optimal selection of muon candidates with TeV-scale transverse momentum (p_T) is a critical factor in determining the sensitivity of analyses looking for new high-mass resonances, such as $Z' \rightarrow \mu\mu$ and $W' \rightarrow \mu\nu$ searches. This work provides an overview on the muon reconstruction method used to account for the differences in position and orientation of the various detector elements, between the geometry assumed in tracking and the real detector. Further, the requirements that define the identification of high- p_T muons in the full Run II ATLAS dataset are detailed, together with several innovations. Such requirements have been tuned to select muons with the best possible momentum resolution, thus ensuring that candidates fulfilling the criteria are of the highest quality. The performance of the high- p_T muon reconstruction and identification is also discussed, based on the result of measurements performed in data and simulation samples corresponding to an integrated luminosity of approximately 140 fb⁻¹.

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