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## High Precision Muon Reconstruction Performance with ATLAS at LHC

*Wednesday, 7 September 2022 16:00 (5 minutes)*

Muon reconstruction performance plays a crucial role in the precision and sensitivity of the Large Hadron Collider (LHC) data analysis of the ATLAS experiment. The 139 fb<sup>-1</sup> of proton-proton collision data collected during the LHC Run-2 poses both a challenge and opportunity for the detector performance. Using di-muon resonances we are able to calibrate to sub per-mil accuracy the detector response for electrons and muons. This talk will present recently released results significantly improving the measurement of muon reconstruction, identification and calibration performance with innovative techniques. New analysis techniques are exploited which involve multivariate analyses for rejecting background hadrons from prompt leptons from the hard interactions as well as innovative in-situ corrections on data that reduce biases in muon momenta induced from residual detector displacements. These techniques are fundamental for improving the reach of measurements and searches involving leptons, such as Higgs decays to dileptons and ZZ or high precision measurements of fundamental constants of the SM such as the Higgs and W masses or the Weinberg's weak mixing angle.

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**Session Classification:** Lightning talk session