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Performance of tau and muon leptons reconstruction and identification in the ATLAS experiment using pp collisions at sqrt(s)=13 TeV and their prospects for the HL-LHC

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The ATLAS experiment is a multi-purpose experiment installed at the Large Hadron Collider (LHC) at CERN, designed to study elementary particles and their interactions in high-energy collisions of proton and heavy ion beams.

Muon and Tau leptons play an important role in many physics processes that are being investigated at the LHC. Hadronic decays of the taus are reconstructed from the combined analysis of the calorimeter and inner tracker informations. This contribution details the performance of the identification, trigger, energy calibration and decay mode classification of hadronic decays of the tau leptons with the ATLAS detector using the Run 2 dataset of pp collisions collected at the LHC at a centre-of-mass energy $\sqrt{s}$=13 TeV. The algorithms and the criteria used in ATLAS for the reconstruction and identification of muons with transverse momentum from a few GeV to the TeV scale will also be presented. Their performance is measured with data based on the decays of Z and J/ψ to pairs of muons, that provide a large calibration sample.
Reconstruction and identification efficiencies are evaluated, as well as momentum scales and resolutions, and the results are used to derive precise corrections for the MC simulation of ATLAS events. Isolation selection criteria and their performances in presence of high pileup will also be presented.

For the high-luminosity phase of the LHC (HL-LHC), the instantaneous luminosity will increase up to $L \simeq 7.5\times10^{34}cm^{-2}s^{-1}$ leading to an average interactions per bunch crossing of up to 200 and the ATLAS detector will undergo a significant upgrade of its sub-systems, including a complete replacement of its inner tracker. The prospects of the reconstruction and identification of tau leptons for the HL-LHC are discussed.

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