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Performance studies of single-particles uncertainties and Local Hadron Calibration for Particle-Flow jets in ATLAS

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Jets play a central role in many physics analyses. Initially jets based on topological clusters (Topo jets) using only the calorimeter information have been used. In the last years, jets reconstructed with the Particle-Flow algorithm (PFlow jets), leveraging also the tracking information, found increasing application. It is thus necessary to test if the calibration methods applied to Topo jets can also be used for PFlow jets in ATLAS. Two different studies will be discussed.
First of all, estimating the uncertainty on the Jet-Energy-Scale (JES) calibration at very high pT (pT > 2 TeV) by using the calorimeter response to single particles (single particle uncertainties) is studied. It is found to be very well applicable to PFlow jets in this pT regime. Further, a good agreement between data and Monte Carlo simulation is observed, which is stable with respect to η as well as pT.
Secondly, the performance of the Local Hadron Calibration (LCW) for PFlow jets (LCPFlow) is investigated. It aims at correcting for the difference in the calorimeter response to processes at the electromagnetic and hadronic scale. This yields very promising results as well: Overall, a better agreement of LCPFlow jets with truth jets is found compared to PFlow jets at the electromagnetic scale (EMPFlow jets). On top of that, LCPFlow jets show an overall better resolution.

Collaboration

ATLAS Collaboration

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