Local Hadron Calibration: A reconstruction and calibration method of hadronic energy deposits in the ATLAS Calorimeters

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Abstract

Calorimetric measurements of hadronic signals are important ingredients for jet physics and the determination of the missing transverse energy in high energy hadron-hadron collider experiments. In this paper we describe the method of local hadron calibration developed for the ATLAS [1] experiment at the large hadron collider (LHC). Based on shape information of clustered energy deposits [2] in the calorimeters the signals are classified as either electromagnetic or hadronic in nature and subsequently calibrated in a sequence of modular correction steps. Each of the corrections attempts to recover energy lost in a certain part of the detector – like invisible energy inside the calorimeter cells, lost signals due to the reconstruction thresholds and energy deposited in non-instrumented regions of the detector. The method is based mainly on single particle simulations and validated with test-beam data [3, 4]. Its application to jets requires additional jet-level corrections for losses of very low energetic particles never reaching the calorimeter as well as corrections due to charged particles bent in or out of the jet by the solenoidal magnetic field.

Key words:

References

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