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Single isolated hadron response measurements in proton-proton collisions at 7 TeV and determination of the jet energy scale uncertainty with the ATLAS detector

The response of single isolated hadrons in the ATLAS calorimeter is measured in proton-proton collisions at a centre-of-mass energy of 7 TeV at the LHC. Isolated tracks with a momentum between 0.5 to 10-20 GeV are selected in the rapidity region up to 2.3. Adjacent energy deposits collected in calorimeter clusters are summed together in a cone of size R=0.2. The measured calorimeter cluster energy sum is compared to the track momentum. Data are in compared in detail to Monte Carlo simulation based on the Geant4 tool-kit and to test-beam measurements. The response to hadrons at low momenta is described by the Monte Carlo simulation with an accuracy of a few percent. Together with test-beam data the results of the single isolated hadron analysis can be used to get a first estimate of the jet energy scale uncertainty in the ATLAS detector.

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