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Performance of the ATLAS Tile Calorimeter

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Content

The Tile Calorimeter (TileCal) is the central scintillator-steel sampling hadronic calorimeter of the ATLAS experiment at the LHC. Jointly with other calorimeters it is designed for energy reconstruction of hadrons, jets, tau-particles and missing transverse energy. The scintillation light produced in the scintillator tiles is transmitted by wavelength shifting fibers to photomultiplier tubes (PMTs). The analog signals from the PMTs are amplified, shaped and digitized by sampling the signal every 25 ns. The TileCal frontend electronics reads out the signals produced by about 10000 channels measuring energies ranging from ~ 30 MeV to ~ 2 TeV. Each stage of the signal production from scintillation light to the signal reconstruction is monitored and calibrated.

The performance of the calorimeter has been established with cosmic ray muons and the large sample of the proton-proton collisions. The response of high momentum isolated muons is used to study the energy response at the electromagnetic scale, isolated hadrons are used as a probe of the hadronic response and its modelling by the Monte Carlo simulations. The calorimeter time resolution is studied with multijet events.

Results on the calorimeter operation and performance are presented, including the calibration, stability, absolute energy scale, uniformity and time resolution. These results show that the TileCal performance is within the design requirements and has given essential contribution to reconstructed objects and physics results.

Summary

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