

Calibration and performance of the ATLAS Tile Calorimeter

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The Tile Calorimeter (TileCal) of the ATLAS experiment at the LHC is the central hadronic calorimeter designed for the reconstruction of hadrons, jets, tau-particles and missing transverse energy. This sampling calorimeter uses steel plates as absorber and scintillating tiles as active medium. The light produced by the passage of charged particles is transmitted by wavelength shifting fibres to photomultiplier tubes (PMTs). The readout is segmented into about 5000 cells, each of them being read out by two PMTs in parallel.

The TileCal calibration system comprises Cesium radioactive sources, laser, charge injection elements, and an integrator based readout system. Combined information from all systems allows to monitor and to equalize the calorimeter response at each stage of the signal evolution, from scintillation light to digitization.

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. The calorimeter time resolution is studied with multijet events. A description of the different TileCal calibration systems and the results on the calorimeter performance during the LHC Run 2 will be presented.

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