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ATLAS Tile calorimeter calibration and monitoring systems

Monday 11 June 2018 13:00 (20 minutes)

The ATLAS Tile Calorimeter (TileCal) is the central section of the hadronic calorimeter of the ATLAS experiment. 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 fibers to photo-multiplier tubes (PMTs), located in the outer part of the calorimeter. The readout is segmented into about 5000 cells, each one being read out by two PMTs in parallel. To calibrate and monitor the stability and performance of the full readout chain during the data taking, a set of calibration sub-systems is used. 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. Calibration runs are monitored from a data quality perspective and used as a crosscheck for physics runs. Data quality in physics runs is monitored extensively and continuously. Any problems are reported and immediately investigated. The data quality efficiency achieved was 99.6% in 2012, 100% in 2015, 98.9% in 2016 and 99.4% in 2017.

Based on LHC Run-I experience, all calibration systems were improved for Run-II. TileCal performance during LHC Run-II, (2015-2017), is discussed, including calibration, stability, absolute energy scale, uniformity and time resolution. Results show that the TileCal performance is within the design requirements and has given essential contribution to reconstructed objects and physics results.

Minioral

Yes

Description

calibration, monitoring

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