



Contribution ID: 192

Type: Poster

Calibration and monitoring of the Tile Calorimeter during LHC Run-I

The ATLAS hadronic calorimeter, the Tile Calorimeter (TileCal), is a non-compensating sampling calorimeter comprised of steel and scintillating plastic tiles which are read-out by photomultiplier tubes (PMTs). The TileCal is regularly monitored and calibrated by several different calibration systems: a Cs radioactive source that illuminates the scintillating tiles directly, a laser light system to directly test the PMT response, and a charge injection system (CIS) for the front-end electronics. These calibration systems, in conjunction with data collected during proton-proton collisions, provide extensive monitoring of the instrument and a means for equalizing the calorimeter response at each stage of the signal propagation. Through the individual calibrations provided by these systems, we are able to achieve a precision of approximately 0.5-1.0% in the monitoring of the evolution of the response of the different components of TileCal. Analysis of the combined calibrations is used to observe the gain variance in the detector response. This contribution presents a brief description of the different TileCal calibration systems with the latest results on their performance during the LHC Run I.

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Track Classification: Sensors: 1a) Calorimetry