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The ATLAS Tile Hadronic Calorimeter performance in the LHC collision era

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The Tile Calorimeter (TileCal), the central section of the hadronic calorimeter of the ATLAS experiment, is a key detector component to detect hadrons, jets and taus and to measure the missing transverse energy. Due to the very good muon signal to noise ratio it assists the spectrometer in the identification and reconstruction of muons. TileCal is built of steel and scintillating tiles coupled to optical fibers and read out by photomultipliers. The calorimeter is equipped with systems that allow to monitor and to calibrate each stage of the readout system exploiting different signal sources: laser light, charge injection and a radioactive source. The performance of the calorimeter has been measured and monitored using calibration data, cosmic muons, LHC single beam and collision events. The results reported here assess the performance of the calibration systems, absolute energy scale, the energy and timing uniformity as well as the calorimeter performance with single hadrons. The obtained results demonstrate a good understanding of the detector and prove that its performance is within the design expectations.

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