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Laboratory tests of the response stability of the ATLAS Tile Calorimeter photomultipliers

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Content

High performance stability of the ATLAS Tile Calorimeter is achieved with a set of calibration procedures. One step of the calibration procedure is based on measurements of response stability to laser excitation of the PMTs that are used to read out the calorimeter cells. A facility to study the performance of the PMT stability response has been operating in the PISA-INFN laboratories since 2015. Goals of the tests are to study the time evolution of the PMT response in order to reproduce and understand the origin of the response drifts observed with the Tile Calorimeter PMTs during LHC Run I and Run II. A new statistical approach was used to measure the drift of the absolute PMT gain. A new procedure which combines studies of the time evolution of the global PMT responses and of the individual PMT gains was adopted to derive the evolution of the cathode quantum efficiency. The experimental setup of the Pisa facility and the first results obtained by testing about 30 PMTs are presented.

Summary

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