

Automated Quality Control for SiPM-on-Tile Modules in the CMS HGCAL Upgrade

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The CMS High Granularity Calorimeter (HGCAL) will be an entirely new calorimeter for the high-luminosity phase of the LHC. It comprises hexagonal silicon modules and scintillating tile modules with silicon photomultipliers for readout, i.e., SiPM-on-tile modules. At DESY, about 2,000 modules are going to be assembled, which requires rigorous and automated quality control (QC) procedures. This contribution will show the design and workflow of the developed QC framework. Its modular approach allows the QC tests to be broken down into a series of steps, which involve interfacing with specialized hardware for data acquisition, studying the module's response when changing configuration parameters, performing on-the-fly data analysis, deriving calibration parameters, and automated reporting. The framework offers a one-click solution to enable even non-expert users to execute the QC procedures and determine if an assembled SiPM-on-tile module meets the standards required for integration into the CMS HGCAL.

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