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The SiPM-on-Tile Section of the CMS High Granularity Calorimeter

For the HL-LHC phase, the calorimeter endcap of the CMS detector will be upgraded with a High Granularity Calorimeter (HGCAL), a sampling calorimeter that will use silicon sensors as well as scintillator tiles read out by silicon photomultipliers (SiPMs) as active material (SiPM-on-tile). The design of the SiPM-on-tile section was inspired by the CALICE AHCAL. The complete HGCAL will be operated at -30°C .

The basic detector unit in the SiPM-on-tile section is the tile module, consisting of a PCB with one or two HGCROC ASICs, reading out up to 96 SiPM-on-tiles. For geometric reasons, the tile modules and the tiles on the tile modules will increase in size with increasing radial distance from the beam pipe. Eight variations of tile modules have been designed to cover the full area of 340 m^2 . This includes the use of two different SiPM sizes and 21 different tile sizes manufactured using two different materials.

Tests on tile modules have been conducted at beam tests at DESY-II and CERN SPS and in lab experiments including using climate chambers operating at -30°C . Production of tile modules for the upgrade is foreseen to start next year. An overview of the current status and production plans of the SiPM-on-tile section will be presented in this poster.

Collaboration / Activity

CMS HGCAL

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