

10th Beam Telescopes and Test Beams Workshop



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Latest Beam Tests of CMS HGCAL Tilemodule Prototypes

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For the HL-LHC phase, the calorimeter endcap of the CMS detector will be upgraded with a High Granularity Calorimeter (HGCAL), a sampling calorimeter which will use silicon sensors as well as scintillator tiles read out by silicon photomultipliers (SiPMs) as active material (SiPM-on-tile). The complete HGCAL will be operated at -30 degC . The SiPMs will be used in areas where the expected radiation dose during the lifetime of the detector is up to $5 \cdot 10^{13}\text{ neq/cm}^2$. The design of the SiPM-on-tile part is inspired by the CALICE AHCAL.

The basic detector unit in the SiPM-on-tile part is the tilemodule, consisting of a PCB with one or two HGCROC ASICs, reading out up to 96 tiles with SiPMs. To acquire the data as well as to send the fast and slow control commands, monitor temperature and voltages from the tilemodules a dedicated DAQ system has been designed and implemented. This DAQ system was tested alongside the latest generation of tilemodules at the October 2021 testbeam at DESY as well as tests at -30 degC were conducted using a climate chamber. Results from these tests will be reported.

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