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HGCAL SiPM-on-Tile Full-Stack Integration with the Serenity Phase-2 DAQ Hardware

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For the upcoming high-luminosity LHC, the endcap calorimeters of the CMS experiment will be replaced by the high-granularity calorimeter (HGCAL). HGCAL is a sampling calorimeter using silicon sensors in the front and plastic scintillators read out by SiPMs in the rear. In this contribution we will present HGCAL's SiPM-on-Tile readout chain and discuss the steps that were necessary to integrate the sensors with the Serenity back-end hardware. The successful commissioning of the readout chain enabled three important tests: First, the full per-series readout chain was tested in a particle beam while operating in a 3T magnetic field. Secondly, we have built and tested a stainless steel absorber stack instrumented with fifteen tile modules, with the goal to study the calorimetric and timing performance. And finally, we have built and tested a complete horizontal slice of scintillator tile modules for system tests of the readout chain.

Speed talk:

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