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The CMS High Granularity Calorimeter for HL-LHC

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Calorimetry in high-energy physics is rapidly evolving, with new challenges and a wide variety of technologies being employed, both for signal creation and detection. Advances in large-area highly-segmented detectors are providing possibilities for high-granularity calorimetry. The CMS HGCAL, being designed to replace the existing CMS endcap calorimeters for the HL-LHC era, is one example. It is a sampling calorimeter, featuring unprecedented transverse and longitudinal readout segmentation for both electromagnetic (CE-E) and hadronic (CE-H) compartments. This will facilitate particle-flow calorimetry, where the fine structure of showers can be measured and used to enhance pileup rejection and particle identification, whilst still achieving good energy resolution. The CE-E and a large fraction of CE-H will use hexagonal silicon sensors as active detector material. The lower-radiation environment will be instrumented with scintillator tiles with on-tile SiPM readout. An overview of the HGCAL project will be presented, covering motivation, engineering design, readout and trigger concepts, and performance in simulation.

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