



Contribution ID: 81

Type: **not specified**

## SiPM-on-Tile Calorimetry for future Higgs factories and beyond

*Thursday, 18 March 2021 13:20 (20 minutes)*

The CALICE collaboration develops highly granular calorimeters for future particle physics experiments. The Analogue Hadron Calorimeter (AHCAL), a sampling calorimeter using small plastic scintillator tiles directly read out by silicon photomultipliers (SiPMs) as active material, is a scalable concept for the hadronic calorimeter, providing good energy, spatial and time resolution at moderate cost.

The CALICE collaboration has built a large AHCAL prototype consisting of 38 active layers in a steel absorber structure of ~4 interaction lengths. The readout electronics for the ~22000 readout channels are fully integrated in the active layers. The prototype has been tested in muon, electron and pion beams at DESY and CERN in 2018, and the analysis of the collected data is ongoing. To fully exploit the potential, beam tests with improved hit time resolution (~1 ns), with an alternative absorber structure made from tungsten, and a combined running with an ECAL prototype are foreseen.

Further possible studies include alternative scintillator materials, scintillator geometries (mega-tiles instead of individual tiles wrapped in reflector foil) and SiPM types. Together with the silicon-tungsten ECAL developed within CALICE, we plan to work on a homogeneous readout system, taking into account the requirements of both technologies. This should also be able to accommodate timing layers with tens of ps hit time resolution. The testbeam programme and the further studies are open to new collaborators and to additional proposals.

The SiPM-on-tile technology has already found an application in the upgrade of the calorimeter endcap of the CMS detector for HL-LHC. The experience gained there in terms of robustness for operation in harsh conditions and construction and commissioning of a large detector is expected to provide important input for further developments.

**Primary author:** KRUEGER, Katja (DESY)

**Presenter:** KRUEGER, Katja (DESY)

**Session Classification:** Calorimetry

**Track Classification:** Calorimetry