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Status of the CALICE AHCAL - a highly granular SiPM-on-tile hadron calorimeter

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The Analogue Hadron Calorimeter (AHCAL) developed by the CALICE collaboration is a scalable technology for a highly granular hadron sampling calorimeter, made from steel absorber plates and 33 cm² plastic scintillator tiles individually read out by silicon photomultipliers (SiPMs). The tiles are individually wrapped in ESR reflector foil. The SPIROC2E front-end chips are integrated into the active layers of the calorimeter. They are designed for minimal power consumption by rapidly cycling the power according to the beam structure of a linear electron-positron collider. The AHCAL provides hit times with a resolution of ~1 ns. In 2017 and 2018, a new large prototype with 38 active layers of 7272 cm² size was built. The prototype was assembled using techniques suitable for mass production. The calorimeter was commissioned at DESY and took muon, electron and pion data at the CERN SPS. In 2022, for the first time data were recorded together with the CALICE SiW ECAL technological prototype.

Further AHCAL hardware developments focus on two areas: 1) an alternative readout ASIC (KLauS) that supports continuous readout, needed for a detector at a circular collider, and 2) "Megatiles" as alternative scintillator geometry.

The contribution gives an overview of AHCAL status and ongoing developments.

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