



Laboratoire LEPRINCE-RINGUET
Ecole polytechnique IN2P3/CNRS

Séminaire

Results of the CMS HGICAL test beams

In 2027 CERN is expected to start the High-Luminosity LHC (HL-LHC) phase.

HL-LHC will integrate 10 times the current luminosity, leading to a high pile-up rate and unprecedented radiation levels. In order to cope with such a harsh environment and maintain the current physics performance, a major upgrade of the LHC detectors is required.

As part of the HL-LHC detector upgrade programme, the CMS experiment is developing a High Granularity Calorimeter (HGICAL) to replace the existing endcap calorimeters. The HGICAL will be realised as a sampling calorimeter, including 36 layers of silicon pads and 14 layers combining both silicon and scintillator detectors interspersed with metal absorber plates. Prototype modules based on 6-inch hexagonal silicon pad sensors with pad areas of 1.0 cm^2 have been constructed. Beam tests of different sampling configurations made from these modules have been conducted at the CERN SPS using beams of charged hadrons and positrons with momenta ranging from 20 to 300 GeV/c. Beam tests play a key role in the validation of the detector's design as well as in the study of the expected physics performance.

In October 2018 the first large scale prototype of HGICAL, consisting of O(100) modules, was tested at CERN.

After a general overview of the HGICAL, the main results of this beam test are going to be presented. The calibration with minimum-ionizing particles, the assessment of the electromagnetic and hadronic physics performance, along with a comparison with a dedicated GEANT4 simulation and the preliminary measurements of the timing resolution for the SKIROC2-CMS ASIC will be discussed.

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**Lundi 10 février
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Responsables séminaires

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