



Contribution ID: 378

Type: Oral

Results from the EPICAL-2 ultra-high granularity electromagnetic calorimeter prototype

Wednesday, 25 May 2022 09:50 (15 minutes)

We are developing a new type of electromagnetic calorimeter based on a SiW sampling design using silicon pixel sensors with digital readout. The R&D is performed in the context of the Forward Calorimeter upgrade proposal within the ALICE experiment and is strongly related to studies of imaging in proton CT; it is equally applicable to other future collider projects such as EIC, ILC, CLIC or FCC. Based on experience with a first full prototype of a digital calorimeter, which demonstrated a proof of principle, we have constructed an advanced second prototype, EPICAL-2, which makes use of the Alpide MAPS sensor developed for the ALICE ITS upgrade. A binary readout is possible due to the pixel size of $\approx 30 \times 30 \mu\text{m}^2$. The prototype consists of alternating W absorber and Si sensor layers, with a total thickness of ~ 20 radiation lengths, an area of $30\text{mm} \times 30\text{mm}$, and ~ 25 million pixels. This prototype has been successfully tested with cosmic muons and with test beams at DESY and the CERN SPS.

We will report on performance results obtained at DESY, showing good energy resolution and linearity, and compare to detailed MC simulations. We will also show preliminary results of shower-shape studies with unprecedented spatial precision and of the high-energy performance as measured at the SPS.

Collaboration

Primary author: PEITZMANN, Thomas (Utrecht University/Nikhef)

Presenter: PEITZMANN, Thomas (Utrecht University/Nikhef)

Session Classification: Calorimetry