

Contribution submission to the conference SMuK 2021

Test beam performance of a digital pixel calorimeter —

•TIM SEBASTIAN ROGOSCHINSKI — Institut für Kernphysik, Goethe-Universität Frankfurt

A prototype of a digital pixel electromagnetic calorimeter, EPICAL-2, has been designed and constructed. It 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. The design is the next step in pixel calorimetry, building on and refining a previous prototype using MIMOSA sensors [1]. The new EPICAL-2 detector employs the ALPIDE sensors developed for the ALICE ITS upgrade. This R&D is performed in the context of the proposed Forward Calorimeter upgrade for ALICE, but it also serves the general understanding of a fully digital calorimeter. The Allpix2 framework [2] was used to perform MC simulations of the detector response and shower evolution in EPICAL-2. We will report on first results on calibration from cosmic muons and on the calorimeter performance measured with the DESY electron beam. The prototype shows good energy resolution and linearity, comparable with those of a SiW calorimeter with analog readout. Electron test beam results can be reproduced by simulation.

[1] JINST13 (2018) P01014

[2] NIM A901 (2018) 164-172

Part:	HK
Type:	Vortrag;Talk
Topic:	Instrumentierung
Email:	rogoschinski@ikf.uni-frankfurt.de