

Simulation of a SiW pixel calorimeter

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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 30mm x 30mm, and ~ 25 million pixels. The design is the next step in pixel calorimetry following up on 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.

We have used the Allpix2 framework [2] to perform MC simulations of the detector response and shower evolution. Electron test beam results can be reproduced. Energy resolution and linearity for the total number of pixel hits and the total number of clusters were investigated, as well as more detailed microscopic features of the shower development and the propagation of particles.

[1] JINST13 (2018) P01014

[2] NIM A901 (2018) 164–172

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