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Sensor-level simulation of MAPS ECal test-beam data

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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 and an area of 30 mm x 30 mm. 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 simulations of the detector response and the shower evolution in EPICAL-2. The detector geometry was implemented and simulation parameters were tuned to reproduce electron test beam results. The general performance of EPICAL-2 for electromagnetic showers was investigated as well as more detailed microscopic features of the shower development.

[1] JINST13 (2018) P01014
[2] Nucl. Instr. Meth. A901 (2018) 164–172

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