

A reconfigurable DMAPS for tracking and Digital Electromagnetic Calorimetry

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The concept of digital calorimetry relies on measuring the number of particles in a shower rather than the energy they deposit. Ultra highly granular calorimeters are required to ensure that there is one particle per cell per readout cycle to avoid saturation effects. A small sensor prototype has been designed and fabricated in the TowerJazz 180 nm CMOS imaging process, using high resistivity 18 μm epitaxial layer. The prototype has a pixel matrix of 64x64 pixels with a pitch of 55x55 μm , and reads out using fast logic at 40 MHz. It can be reconfigured to function as either a binary short strip sensor, for particle tracking including as a pre-shower, or as a pad sensor, counting the number of pixels above threshold for digital calorimetry. We will present the sensor overview, MC simulations in the context of FCC-hh which guided the design, results from testing of the chip, particularly the reconfigurable logic, and results obtained when the device is illuminated with a 1064 nm laser

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