

Full-size passive CMOS sensors for radiation tolerant hybrid pixel detectors

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CMOS process lines are an attractive option for the fabrication of hybrid pixel sensors for large-scale detectors like the ATLAS and CMS detectors. Besides the cost-effectiveness and high throughput of commercial CMOS lines, multiple features like poly-silicon layers, metal-insulator-metal capacitors and several metal layers are available to enhance the sensor design.

After an extensive R&D programme with several prototype sensors using the 150 nm LFoundry technology, passive CMOS pixel sensors have been manufactured for the first time as full-size sensors compatible with the RD53 readout chips.

This presentation will focus on IV-curve measurements and the characterization of the full-size sensors, before and after irradiation to fluences of 2×10^{15} neq/cm² and 5×10^{15} neq/cm², using a minimum ionising electron beam. The measured hit-detection efficiency after a fluence of 5×10^{15} neq/cm² is larger than 99 %.

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