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Characterization, Simulation and Test Beam Data Analysis of Stitched Passive CMOS Strip Sensors

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In the passive CMOS Strips Project, strip sensors were designed and produced at LFoundry in 150 nm technology, with an additional backside processing from IZM Berlin. Up to five individual reticules were connected by stitching at the foundry in order to obtain the typical strip lengths required for the LHC Phase-II upgrade of ATLAS or CMS trackers. After dicing, sensors were tested in a probe station and characterised with a Sr90-source as well as laser-based edge- and top-TCT systems. Sensors were also simulated using Sentaurus TCAD. At last, detector modules were constructed from several sensors and thoroughly studied in a test beam campaign at DESY. All of these measurements were performed before and after irradiation. This presentation will provide an overview of simulation results, summarize the laboratory measurements and in particular present the test beam results for irradiated and unirradiated passive CMOS strip sensors. We will demonstrate that large area sensors with sufficient radiation hardness can be obtained by stitching in this CMOS process, and present our plans for the next CMOS submission in the framework of this project.

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