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Simulation and Test Beam Results of Passive CMOS Strip Sensors

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Nearly all future high-energy particle detectors will employ large areas of radiation hard silicon sensors as their main tracking detectors, facilitating the need for cost-efficient, reliable and large scale production. A promising avenue of research are sensors based on the CMOS imaging process.

Three variations of passive CMOS strip sensors have been designed by the University of Bonn and produced by LFoundry in a 150 nm process. In order to reach strip lengths typical for HEP sensors, up to five reticules were connected via stitching during the photolithography process. Sensor samples have been irradiated up to a fluence of $1 \cdot 10^{16} \mathrm{n_{eq}}/\mathrm{cm}^2$ with reactor neutrons and up to $1 \cdot 10^{15} \mathrm{n_{eq}}/\mathrm{cm}^2$ with 23 GeV protons.

Studies of the devices include the simulation of unirradiated sensor samples with Sentaurus TCAD as well as test beam campaigns conducted at the DESY II facility, focusing on the hit detection efficiency and resolution of samples at different fluences.

This contribution will give a brief overview of the most important results of these studies, with the main focus being put on the results of the test beam analysis.

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