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Performance Evaluation of the Stitched Passive CMOS Strip Sensors before and after irradiation

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Future particle physics experiments are motivated by the increase in luminosity and thus the need for intelligent tracking detectors providing fast track and momentum information to select events of interest. The next-generation tracking detectors are mostly all silicon-based detectors, thus they will cover large areas and therefore be the main cost driver. The currently used silicon sensors are available only from very few manufacturers, thus finding a cost-effective solution to maximize the output is important.
Commercial CMOS technology for silicon strip sensors is a prime candidate, which allows the use of large and high-resistive wafers and also provides the advantage of widely established industrial production processes.

The passive CMOS silicon strip sensors presented in this contribution is processed by a European foundry, in a 150 nm CMOS technology. The sensor has three different strip designs to study in two different lengths 4.1 cm and 2.1 cm. They are formed by stitching individual reticles and a maximum of five reticles are stitched into one 4.1 cm long sensor.

The key investigation is to evaluate the impact of stitching and the overall sensor performance with novel tools. The sensors are irradiated with proton and neutron beams to study the effects of radiation damage. This study presents the electrical measurements and test beam results of the sensors before and after irradiation

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