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Test Beam Characterisation of passive CMOS Strip Sensors

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In high-energy physics, upgrades for particle detectors and studies on future particle detectors are largely based on silicon sensors as tracking devices. The surface that needs to be covered by silicon sensors is constantly increasing so that they become an immense cost driver in particle physics experiments.
Consequently, there is a need to investigate new silicon sensor concepts that can realise large-area coverage and cost-efficiency.
A promising technology is found in passive CMOS sensors, based on CMOS imaging technology. They provide a lowered sensor cost by being produced in commercial chip processing lines. Since passive CMOS sensors do not contain any active elements they also allow for a large choice of possible vendors.

The passive CMOS project at DESY is investigating passive CMOS strip sensors fabricated at LFoundry in a 150 nm technology.
The process of stitching achieves two different strip formats of the n-in-p sensor. Furthermore, the strip design varies in doping concentration and width of the n-well to study various depletion concepts.
The sensor performance is evaluated based on test beam measurements conducted at the DESY II test beam facility at DESY Hamburg.
In order to process the strip sensor data the ALiBaVa (Analogue Liverpool, Barcelona, Valencia) readout system is used.
This presentation will provide results of the test beam data analysis with the Corryvreckan software, as well as comparisons between irradiated and unirradiated strip sensors, concerning their hit detection efficiency.

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