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Silicon Sensor Developments for the CMS Tracker Upgrade

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CMS started a campaign to identify the future silicon sensor technology baseline for a new Tracker for the high-luminosity phase of LHC. We ordered a large variety of 6" wafers in different thicknesses and technologies at HPK. Thicknesses ranging from 50 μ m to 300 μ m are explored on floatzone, magnetic Czochralski and epitaxial material both in n-in-p and p-in-n versions. P-stop and p-spray are explored as isolation technology for the n-in-p type sensors as well as the feasibility of double metal routing on 6" wafers. Each wafer contains different structures to answer different questions, e.g. geometry, Lorentz angle, radiation tolerance, annealing behavior, read-out schemes. Dedicated process test-structures, as well as diodes, mini-sensors, long and very short strip sensors and real pixel sensors have been designed for this evaluation.

The structures will be exposed to mixed fluences composed of protons and neutrons representing the mixture of charged hadrons and neutrons as expected in the CMS Tracker after an integrated luminosity of 3000fb⁻¹ at several radii.

This contribution provides an overview of the individual structures and their characteristics and summarizes interesting measurements performed so far.

Preferred medium (Oral/poster)

Oral

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