

Time is of the essence: Depleted Monolithic Silicon Sensors

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The ultimate goal for tracking detectors is the combination of excellent spatial resolution, low material budget, high radiation tolerance and excellent timing resolution for the ultimate tracking performance.

Many different approaches are taken to reach this goal, with CMOS based silicon detectors providing one of the most promising angles of approach.

The Nikhef Detector R&D group, as a part of the CERN RD50-CMOS collaboration, works on the development of radiation hard monolithic detectors based on a 150 nm High Voltage CMOS process by LFoundy and investigates their viability for future particle physics experiments.

As part of the ongoing developments, the newest prototype, the RD50-MPW3 was completed recently. The RD50-MPW3 consists of a 64×64 pixel matrix arranged in a 32 double-columns. The $62 \mu\text{m}$ pixels include both the analog front-end as well as the digital readout unlike its predecessor that consisted of 8×8 pixels of $60 \mu\text{m}$ pixel pitch that only included the analog front-end.

In this talk I will present an overview of the activities of the Nikhef Detector R&D group in determining the achievable time resolution of the MPW2 predecessor chip as well as first results of the current MPW3 prototype.

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