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[D03] Design and performance of RD50 DMAPS sensors for future colliders

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The CERN RD50 collaboration develops depleted monolithic active pixel CMOS sensors for future colliders with the aim of high radiation tolerance, good time resolution, and high granularity pixel detectors. The most recent prototype, the RD50-MPW3, is a 150 nm High Voltage CMOS LFoundry chip that features pixels with a 62 µm pitch that integrate both digital and analog readout electronics inside the sensing diodes. The 64 x 64 pixels on this chip are arranged in 32 double columns and have an optimized periphery for efficient configuration and fast serial data transmission. Post-layout simulations of a single pixel show a power consumption of 22 µW per pixel and 9 ns time walk.

The predecessor of this version, the RD50-MPW2, was shown to be efficient in tests at beam facilities and to have a timing precision better than 1 ns before irradiation. It was evaluated at a fluence of $2 \cdot 10^{15}$ n_{eq}/cm^2. This talk will discuss the design of the latest advanced prototype, the MPW3, the performance of the MPW2, and the first results for the MPW3.

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