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Overview of design and evaluation of depleted CMOS sensors within RD50

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This contribution describes the status of the design and evaluation of depleted CMOS sensors within the CERN-RD50 collaboration. In particular, we will present laboratory measurements of RD50-MPW1 and TCAD simulated results of the structures on this chip. The results obtained so far, especially those related to the leakage current generated by the sensors, necessitate the submission of a second test MPW prior to the fabrication of the planned large area submission (RD50-ENGRUN1). The second test MPW (RD50-MPW2) will integrate several passive single pixels with different features and one or two very small matrices of pixels with fast low-noise readout circuitry. The aim of RD50-MPW2 is to understand the origin of the leakage current generated by the sensors and to evaluate different approaches to minimizing this problem. We will report on the microelectronic design and TCAD simulations towards RD50-MPW2. We will also report on the progress of design work towards RD50-ENGRUN1. In particular, that related to the improvement of the time resolution of depleted CMOS sensors with the utilization of sampling circuitry.

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