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Developments for Radiation Hard Silicon Detectors by Defect Engineering -Results of the CERN-RD48 (ROSE) Collaboration-

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ABSTRACT

The success of the Oxygen enrichment of FZ silicon as a highly powerful defect engineering technique and its optimization with various commercial manufacturers are reported. Major focus is on the changes of the effective doping concentration (depletion voltage). Other aspects (reverse current, charge collection) are covered too. Diode characteristics of test pad- and LHC-strip detectors are compared. The RD48 model for the dependence of radiation effects on fluence, temperature and operational time is verified; projections to operational scenarios for main LHC experiments demonstrate vital benefits. Present microscopic understanding of damage effects including differences caused by charged and neutral hadrons are discussed too.

102 words, allowed: 100