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Radiation tolerance of a moderate resistivity substrate in a modern CMOS process

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The LePix project aims at developing monolithic detectors integrating reverse biased detecting diodes and readout circuitry in 90 nm CMOS. In this framework we are investigating the radiation tolerance of the base material, which is an order of magnitude more doped than standard high resistivity detectors, and which underwent the full advanced CMOS process.
This investigation is carried out on diodes of about one square mm, of which samples were irradiated with neutrons at fluences from 10^{12} to 10^{16} neutrons per square cm. The irradiated devices were characterized using CV, IV, and pulsed laser measurements. Other than diodes, we also have irradiated pixel matrices up to same fluences, and we started to characterize them. These matrices were already irradiatied with Xrays, and we were able to prove they withstand at least 10 Mrad. We will show the measurement results and draw conclusions.

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