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Inter-pixel resistance measurements of irradiated pixel sensors with different isolation structures

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So-called "passive CMOS" pixel and stript sensors using commercial CMOS chip fabrication lines have become an interesting alternative to standard planer sensors. An important question is how the resistance between electrodes changes as a function of irradiation fluence for various implant geometry. We present preliminary results on the measurements of the inter-pixel resistance of passive CMOS sensor test-structures fabricated in the LFoundry 150 nm CMOS technology. The inter-pixel resistance of two types of test-structures, namely with and without equipping p-stop isolation between pixel implants, were evaluated by fitting the current-voltage behavior between a single pixel and the surrounding pixels. Unirradiated samples of both types deliver a resistance of $\sim 10^{14}\,\Omega$. Results from the samples after $14\,\mathrm{MeV}$ proton irradiation ($5 \times 10^{14}\,\mathrm{neq\,cm^{-2}} - 1 \times 10^{16}\,\mathrm{neq\,cm^{-2}}$) reveal a drop of the resistance by approximately 3 orders of magnitude for the structures with p-stop and approximately 6 orders of magnitude for the ones without p-stop. From the data, no clear dependence of inter-pixel resistance on the proton irradiation fluence is observed.

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