

Impact of proton irradiations on the electrical properties of n-type Si-diodes

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Silicon n-type diodes made of FZ and MCz material were manufactured for the CMS HPK campaign and irradiated with 23 MeV and 23 GeV protons. At a fluence of $3 \times 10^{14} / \text{cm}^2$ neq the MCz n-type diodes demonstrate clear type inversion after 23 MeV proton irradiation. This does not appear after the irradiation with 23 GeV protons. An influence of process induced bulk defects could be excluded.

In order to get a deeper understanding of the differences of the radiation induced defects, the Thermally Stimulated Current Technique (TSC) was used.

The sensors were electrically characterized by means of capacitance-voltage (C-V) and current-voltage (I-V) measurements. Transient current technique pulses (TCT) and charge collection efficiency (CCE) measurements have indicated a dependence of the bulk damage on the proton energy. Moreover a dependence on the oxygen concentration of the sensors could be observed.

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