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Irradiation study on diodes of different silicon materials for the CMS tracker upgrade

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The aim of the CMS tracker upgrade campaign is to find a new radiation hard sensor material for the HL-LHC upgrade of the CMS tracker. Different test structures and sensors were implemented on a variety of silicon materials with different thicknesses by Hamatsu Photonics, Japan. Samples have been irradiated to fluences up to 1.5E15 with protons at Karlsruhe and the CERN PS and with reactor neutrons at Ljubljana.

To find a radiation hard sensor material we investigated current characteristics (I-V), capacitance characteristics (C-V) and characteristics of charge collection (TCT).

This talk will present the results concerning dark current, effective doping concentration and charge collection efficiency and their annealing, key parameters in defining a material well suited for the upgrade of the CMS tracker.

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