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Characterization of micro-strip detectors made with high resistivity n- and p-type Czochralski silicon

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We report on the processing and characterization of micro-strip sensors produced on n- and p-type Czochralski silicon. The aim of this work is the development of radiation hard detectors for very high luminosity colliders. The activity is funded by INFN within the SMART project in the framework of the RD50 Collaboration.
The devices have been produced by ITC-IRST on 4”wafers, together with test-structures to monitor the process parameters and to study the modification of the bulk and of the surface properties as a function of the received fluence. Each wafer hosts ten mini-sensors with different strip geometries in order to compare the detector performances while varying the widths of the strip p+ implantation and of the metal layer.
The detectors have undergone two irradiation campaigns using 24 GeV/c protons at CERN and 26 MeV/C protons in Karlsruhe up to fluences of 5.0x1015 cm-2 and 1.6 x1015 cm-2 respectively.
The mini-sensors have been characterized before and after irradiation by measuring the IV and CV characteristics, the inter-strip capacitance and with scans of the strip currents.
Their performances have been compared with those of detectors of the same design processed on standard Fz silicon. Their relative radiation hardness has been established in terms of the depletion and breakdown voltages and by studying the inter-strip capacitance.
The preliminary outcomes of these measurements are discussed.

Author: Dr MACCHIOLO, Anna (INFN Firenze and Università di Firenze, Italy)

Presenter: Dr MACCHIOLO, Anna (INFN Firenze and Università di Firenze, Italy)

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