

Cobalt-60 gamma irradiation of p-type silicon test structures for the HL-LHC

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During the era of the High-Luminosity (HL) LHC the experimental devices will be subjected to enhanced radiation levels with fluxes of neutrons and charged hadrons in the inner detectors up to $2.3 \times 10^{16} n_{eq}/cm^2$ and total ionization doses up to ~ 1.2 Grad. A systematic program of radiation tests with neutrons and charged hadrons is being run by the LHC detector collaborations in view of the upgrade of the experiments, in order to cope with the higher luminosity of HL-LHC and the associated increase in pile-up events and radiation fluxes. In this talk we present results from complementary radiation studies with $^{60}Co-\gamma$ in which the doses are equivalent to those that the outer layers of the silicon tracker systems of the large LHC experiments will be subjected. The devices under test are float-zone oxygenated p-type silicon diodes and MOS capacitors. CV and IV measurements on these test structures are presented as a function of the total absorbed radiation dose following specific annealing protocol.

Primary author: ASENOV, Patrick (Nat. Cent. for Sci. Res. Demokritos (GR))

Co-authors: ASSIOURAS, Panagiotis (Nat. Cent. for Sci. Res. Demokritos (GR)); KAZAS, Ioannis (Nat. Cent. for Sci. Res. Demokritos (GR)); KYRIAKIS, Aristoteles (Nat. Cent. for Sci. Res. Demokritos (GR)); LOUKAS, Dimitrios (Nat. Cent. for Sci. Res. Demokritos (GR))

Presenter: ASENOV, Patrick (Nat. Cent. for Sci. Res. Demokritos (GR))

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