Contribution ID: **198** Type: **Poster**

P1.43: Timing performance and efficiency of irradiated 3D-trench silicon sensors

Monday, 26 June 2023 15:33 (1 minute)

We present results of characterization measurements on irradiated 3D-trench silicon sensors, designed within the TimeSPOT project, and produced by FBK, Trento. The sensors were irradiated at different fluences at the Ljubljana reactor facility and then characterized both in the INFN Cagliari laboratory using a 90Sr source and under 180 GeV/c charged pions at the SPS (CERN, Geneve).
The sensors show nominal efficiency and high timing performance even after fluences of some 1-MeV neq/cm2, while requiring a modest overvoltage to recover the damage due to radiation exposure.
The paper illustrates the results on efficiency and timing across different measurement methods, fluences and experimental conditions. The systematic studies demonstrate that a time resolution around 10-ps can be obtained up to the maximum fluency, and that the radiation resistance limit of this technology is still to be reached.

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Session Classification: Poster (incl. coffee)