Contribution ID: **503** Type: **Parallel session talk**

Characterization of carbonated gain implants in Ultra Fast Silicon Detectors (UFSD) pre- and post-irradiation

Wednesday, May 26, 2021 8:42 AM (18 minutes)

Ultra Fast Silicon Detector (UFSD) is an innovative thin silicon sensor, based on Low Gain Avalanche Diode technology, able to measure the time of a hit with a temporal precision of ~30 ps. The application of this technology in HL-LHC experiments requires unaltered temporal performances at fluences of the order of 1E15 neq/cm2, making the radiation resistance a key point of this technology. Past UFSD productions, fabricated by Fondazione Bruno Kessler (FBK), demonstrated the improvement of radiation hardness when the gain implant is enriched with carbon. In past FBK productions, shallow and deep gain implants have been enriched with carbon doses from 0.4 to 10 a.u., with the aim of mapping the carbon effect as a function of carbon dose. This contribution will illustrate how the carbon dose that maximizes the radiation resistance of the gain implant has been identified, and that, in combination with a deep gain implant, allows to maintain unchanged performances up to 2.5E15 neq/cm2.

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No, this is an entirely new submission.

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Università del Piemonte Orientale

Primary author: FERRERO, Marco (Universita e INFN Torino (IT))

Co-authors: CARTIGLIA, Nicolo (INFN Torino (IT)); ARCIDIACONO, Roberta (Universita e INFN Torino (IT)); COSTA, Marco (Universita e INFN Torino (IT)); SOLA, Valentina (Universita e INFN Torino (IT)); MANDURRINO, Marco (INFN); TORNAGO, Marta (Universita e INFN Torino (IT)); SIVIERO, Federico (Universita e INFN Torino (IT)); V METH MILANESIO, Matteo; BOSCARDIN, Maurizio (FBK Trento); PATERNOSTER, Giovanni (Fondazione Bruno Kessler); BORGHI, Giacomo (Fondazione Bruno Kessler); CENTIS VIGNALI, Matteo (FBK); FICORELLA, Andrea; Prof. DALLA BETTA, Gian Franco (Universita degli Studi di Trento and INFN (IT)); PANCHERI, Lucio (University of Trento); MENZIO, Luca (Università degli Studi di Torino); Dr HAMMAD ALI, Omar (FBK)

Presenter: FERRERO, Marco (Universita e INFN Torino (IT))

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