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[B04] Characterisation of 3D pixel sensors for the CMS upgrade at the High Luminosity LHC

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The High Luminosity upgrade of the CERN Large Hadron Collider (HL-LHC) calls for an upgrade of the CMS tracker detector to cope with the increased radiation fluence, 2.3E16 neq/cm2 (1MeV equivalent neutrons) for the innermost layer while maintaining the excellent performance of the existing detector. An extensive R&D program aiming at 3D pixel sensors, built with a top-side only process, has been put in place by CMS in collaboration with FBK (Trento, Italy) and CNM (Barcelona, Spain) foundries. The basic 3D cell pixel sizes are 50x50 or 25x100 µm2, with one central readout electrode to be connected to the readout chip. In this presentation results obtained in beam test experiments before and after irradiations, up to ˜2E16 neq/cm2, will be reported. The sensors were read out by RD53A and CROC, the first and last version of the 65 nm CMOS technology pixel readout chips which will be used in the HL-LHC inner tracker.

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