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Performance of irradiated 3D pixel sensors interconnected to RD53A readout chip

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In this presentation results obtained in beam test experiments with 3D columnar pixel sensors interconnected with the RD53A readout chip will be reported. The 3D pixel sensors were produced at FBK foundry in an R&D agreement with Istituto Nazionale di Fisica Nucleare (INFN, Italy). A few modules, each consisting of a 3D pixel sensor bump-bonded to an RD53A chip, were irradiated at the CERN IRRAD facility to an equivalent fluence of about 1E16 neq/cm2 (1MeV equivalent neutrons). The modules were tested on high energy proton beams, both at CERN H6, using Bdaq53 hardware and software framework, and at the Fermilab Test Beam Facility (FTBF) using Yarr system. Results obtained from the two different systems will be shown, comparing module performance before and after irradiation. Preliminary analysis of collected data shows hit detection efficiencies measured after irradiation which already at the level of the values required for the upgrade of the inner tracker of the CMS experiment.

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