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Performance of irradiated RD53A pixel modules with passive CMOS sensors

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Passive CMOS pixel sensors are investigated in the context of the CMS Phase2 Tracker Upgrade. A prototype production of RD53A compatible pixel sensors was recently completed at LFoundry in 150nm CMOS process. This presentation will focus on the characterization of irradiated and non-irradiated pixel modules, composed by a CMOS passive sensor interconnected to a RD53A chip. The sensors are designed with a pixel cell of 25 $\mu\text{m} \times 100 \mu\text{m}$ in case of DC coupled devices and 50 $\mu\text{m} \times 50 \mu\text{m}$ for the AC coupled ones. Their performance in terms of charge collection, position resolution, and hit efficiency was studied with measurements performed in the laboratory and with beam tests. The RD53A modules with LFoundry silicon sensors were irradiated to fluences up to $2 \times 10^{16} \text{ neq/cm}^2$.

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