

Pixel Chip Developments and Radiation Qualification for the High Luminosity LHC

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The RD53 collaboration is a joint effort between the ATLAS and CMS experiments facing the challenges of developing hybrid pixel readout chips for their Phase-2 upgrades in the HL-LHC (High Luminosity Large Hadron Collider).

A prototype chip, called RD53A, was designed to qualify the chosen 65nm CMOS technology. Among all its features, this large size demonstrator contains design variations for testing purposes, different analog front-end and digital architectures, and radiation test structures. The chip has been extensively used for sensor characterization and the design, test, and verification of the system architectures of ATLAS and CMS.

A summary of test results will be shown highlighting the radiation characterization including dose rate effects, vital for the correct performance of the chip in the harsh environment of the HL-LHC. The final chips, designed based on these results, will be presented as well as the first preliminary test results.

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