

RD53 pixel chips for the ATLAS and CMS Phase-2 upgrades at HL-LHC

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The Phase-2 upgrades of ATLAS and CMS will require a new tracker with readout electronics operating in extremely harsh radiation environment (1 Grad), high hit rate (3GHz/cm²) and high data rate readout (5 Gb/s). The RD53 collaboration is a joint effort between the ATLAS and CMS experiments, established in 2013 and extended in 2018, to qualify the chosen 65nm CMOS technology and develop the readout chips for the HL-LHC pixel detectors of both experiments. Due to different mechanical constraints of the two trackers and specific requirements of each experiment, the chips have been designed in two flavours, having different dimensions and analog front-end.

After a half-scale demonstrator (RD53A) and full scale prototypes of the two ASICs (RD53B-ATLAS and RD53B-CMS), largely used by the two communities to characterize 3D and planar sensors, RD53 has developed the final chips: RD53C-ATLAS, submitted to foundry in March 2023 and RD53C-CMS, expected to be submitted in August 2023.

A general overview of the chip architecture and test results on the RD53B prototypes will be presented.

Your name

Flavio Loddo

Institute

INFN-Bari

Email address

flavio.loddo@cern.ch

Primary author: LODDO, Flavio (Universita e INFN, Bari (IT))

Presenter: LODDO, Flavio (Universita e INFN, Bari (IT))

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