

MICROÉLECTRONIQUE@CPPM

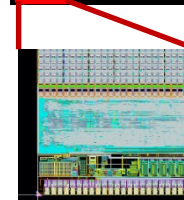
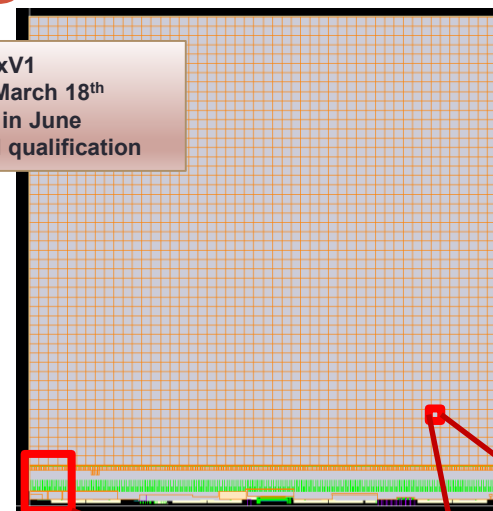
P. Pangaud

29 Septembre 2020

LHC contributions : Design activities

- RD53 collaboration
 - RD53B design
 - RD53B Monitoring block design
 - Participation on the RD53B integration and verification
 - Verification and simulation
 - Development of Irradiation corner model distributed to the collaboration
 - RD53B ATLAS chip (ITKpixV1) submitted March 18, 2020
 - First wafers received June 2020 :
 - All the tested functionalities are working as expected
 - High digital current because of an issue in the ToT latches
- GBT project :
 - IpGBTIA chip design (2019) : Low power Low noise optical receiver at 2.5 Gbit/s
 - New design developed in 2020 to improve ESD and reduce power supply noise sensitivity

ITkPixV1
Submitted March 18th
Received in June
Under Test and qualification



Chip Bottom

Core : 64 pixels



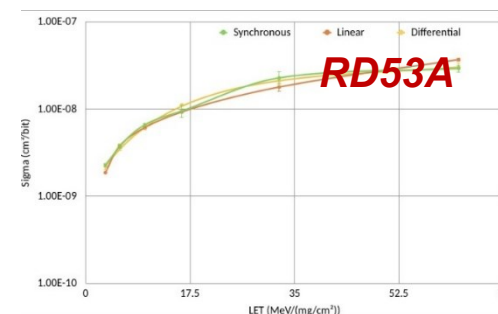
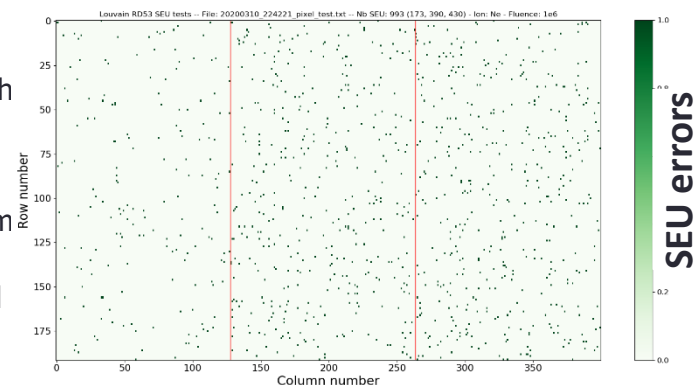
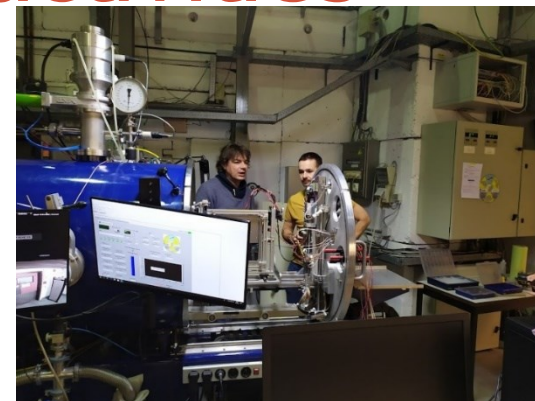
Pixel : 50 μm $\times$ 50 μm



GBTIA Optical Receiver



LHC contributions : Tests activities



- RD53A SEU tests done March 10th Cyclotron of Louvain La Neuve with Heavy Ions at different energies
 - The main was the preparation for the RD53B SEU qualification
 - Tests carried out successfully
 - The tests were disturbed by Chip-FPGA communication problems, which should be reviewed for RD53B test
- ITkPixV1 SEU tests will be carried out the end of September (before CMS submission)
 - Improvement (if required) can be implemented the CMS chip
 - Can later be implemented in the production chip
 - Collaboration CPPM-CERN for scripts development and adapting RD53A scripts for th ITkPixV1
- Preparation of the ITkPixV1 TID Tests at low temperature (-20°C)
 - Collaboration with L2MNP (Aix Marseille Univ) - X-ray machine available for long tim irradiations
 - Already used to irradiate RD53A chip at room temperature (High Dose rate and Low dose rate)
 - Development of Peltier cooling system for low temperature irradiation
 - Dry air installation for low temperature tests
 - Irradiation campaign to be started as soon as the tube is repaired
- CPPM in charge of GBTIA Wafer tests (130 nm)
 - 24 wafers tested in 2020 to meet production needs for future upgrades.
 - 24 additional wafers to be tested before the end of 2020

Projets futurs

- Futurs expériences et R&D
 - R&D DMAPS
 - Participation aux projets LF-MONOPIX2 et TJ-MONOPIX2 (180nm)
 - Intérêt dans Belle II : partie VXD
 - Participation à RD50 (circuit à petits pixel, Mémoire SEU etc)
 - [CERN EP roadmap WP1.2](#) : contribution sur l'évaluation de technologie TJ 65nm
 - Technologie 28nm
 - Intérêt et participation à l'effort avec le CERN.
 - Prospectives, projets transverses etc
 - Projet DICE « Développements pIxels pour les taux de Comptage et niveau de radiations Extrêmes »
 - AIDANova (28nm et HVCMOS)
 - LoI DMAPS 65nm (IPHC, IP2I, CPPM...)
 - [Workshop CEPC \(26-28 oct 2020\)](#) : contribution DMAPS & Hybride
 - Prospectives IN2P3 : Groupe GT08 avec intérêt DMAPS et 28nm
 - [Journée R&T \(16-18 nov 2020\)](#) : contribution DICE