Contribution ID: **46** Type: **Poster**

Laboratory measurements of 3D devices assembled with FEi4 readout electronics

Monday 20 February 2017 18:50 (15 minutes)

During the 2023-2024 shutdown, the Large Hadron Collider (LHC) will be upgraded to reach an instantaneous luminosity up to 7×10 cm-2 s-1. This upgrade of the accelerator is called High-Luminosity LHC (HL-LHC). The ATLAS and CMS detectors will be replaced to meet the challenges of HL-LHC: an average of 200 pile-up events in every bunch crossing and an integrated luminosity of 3000 fb-1 over ten years.

In order to have high resolution tracking performance, in such a challenging and dense environment, pixel cell size needs to be minimized. A new 65 nm Front-End is being developed by the RD53 collaboration with a readout cell size of 50 × 50 μm2 . The new front-end chip will be compatible with 50 × 50 μm2 or 25 × 100 μm2 pixel size sensors.
Italian groups are involved in the R&D effort on the design and production of new 3Ds sensors with thicknesses of 100 to 200 μm, 5 μm diameter columns and smaller pixel cells. A first batch of sensors have been produced by FBK Trento. As the new read-out chip with small pixel size is not available yet, sensors have been bump-bonded by Leonardo to FE-I4 chips, the read-out electronics used in the Pixel layer inserted in ATLAS in 2014. Although the read-out size is 50x250 μm2 , measurements of the new smaller size sensor pixel have been done.

This short contribution is meant to be a poster detailing the measurements done in the laboratory on all the 3D devices. So it will report the full statistics of the assembled devices, their IV curves, noise as a function of the pixel size,
charge collection using sources and laser setup.

TRACK

3D Sensors

Presenter: FUMAGALLI, Elisa (Universita e INFN Genova (IT))

Session Classification: Session 4: Poster Session