



Contribution ID: 28

Type: **contributed paper**

3D sensors for the HL-LHC

3D silicon detectors, with cylindrical electrodes that penetrate the sensor bulk perpendicular to the surface, have recently undergone a rapid development from R&D, to industrialization, to their first operation in a high-energy-physics experiment. Since June 2015, the ATLAS Insertable B-Layer is taking collision data with 3D pixel sensors. At the same time, 3D devices have been installed in February 2016 as part of the ATLAS Forward Proton detector. The next challenge for tracking detectors is the high-luminosity LHC (HL-LHC) tracker upgrades, where fluences of up to $1.4E16$ neq/cm² are expected for the innermost layer. The 3D technology is a firm candidate for the innermost pixel layers given its excellent radiation hardness at low operational voltages and power dissipation. This paper will give an overview on the recent developments of the HL-LHC generation of 3D sensors.

Summary

The talk will briefly review the development and performance of 3D sensors for the ATLAS IBL and the AFP detectors. The challenges presented by the HL-LHC require new technological improvements to accommodate the larger radiation doses and smaller pixel sizes. The strategy to develop 3D sensors for the HL-LHC era will be discussed. Results from laboratory and testbeams of irradiated and non-irradiated devices with new pixel geometries will be presented.

Primary author: GRINSTEIN, Sebastian (IFAE Barcelona)

Co-author: LANGE, Joern (IFAE Barcelona)

Presenters: LANGE, Joern (IFAE Barcelona); GRINSTEIN, Sebastian (IFAE Barcelona)