



Contribution ID: 3

Type: **not specified**

The Pixel Detector of the ATLAS experiment for the Run2 at the Large Hadron Collider

Friday, 10 October 2014 09:40 (20 minutes)

The Pixel Detector of the ATLAS experiment has shown excellent performance during the whole Run-1 of LHC. Taking advantage of the long shutdown, the detector was extracted from the experiment and brought to surface, to equip it with new service quarter panels, to repair modules and to ease installation of the Insertable B-Layer (IBL). IBL is a fourth layer of pixel detectors, and has been installed in May 2014 between the existing Pixel Detector and a new smaller radius beam-pipe at a radial distance of 3.3 cm from the beam axis.

The realization of the IBL required the development of several new technologies and solutions in order to overcome the challenges introduced by the extreme environment and working conditions, such as the high radiation levels, the high pixel occupancy and the need of an exceptionally low material budget.

Two silicon sensor technologies have been adopted for the IBL modules: planar n-in-n and 3D. Both of these are connected via bump bonding to the new generation 130 nm IBM CMOS FE-I4 front-end read-out chip.

Furthermore, the physics performance will be improved through the reduction of pixel size while, targeting for a low material budget, a new mechanical support using lightweight staves and a CO₂ based cooling system have been adopted.

An overview of the refurbishing of the Pixel Detector and of the IBL project as well as the experience in its construction will be presented, focusing on adopted technologies, module and staves production, qualification of assembly procedure, integration of staves around the beam pipe and commissioning of the detector.

Primary author: GUESCINI, Francesco (University of Geneva)

Presenter: GUESCINI, Francesco (Universite de Geneve (CH))

Session Classification: Upgrading LHC Experiments