



ATLAS Silicon Microstrip Tracker and Pixel Detector: Status and Performance

Friday, July 6, 2012 9:00 AM (15 minutes)

The Semi-Conductor Tracker (SCT) and the Pixel Detector are the key precision tracking devices in the Inner Detector of the ATLAS experiment at CERN LHC.

The SCT is a silicon strip detector and is constructed of 4088 silicon detector modules for a total of 6.3 million strips. Each module is designed, constructed and tested to operate as a stand-alone unit, mechanically, electrically, optically and thermally. The SCT silicon micro-strip sensors are processed in the planar p-in-n technology. The signals from the strips are processed in the front-end ASICS ABCD3TA, working in the binary readout mode.

The Pixel Detector consists of approximately 80 million pixels that are individually read out via chips bump-bonded to 1744 n-in-n silicon substrates.

In the talk the current status of the SCT and Pixel Detector will be reviewed. We will report on the operation of the detectors including an overview of the issues we encountered and the observation of significant increases in leakage currents (as expected) from bulk damage due to non-ionising radiation.

The main emphasis will be given to monitoring, calibration procedures, timing optimization, detector performance, and the data quality during the many months of data taking (the LHC delivered 47pb⁻¹ in 2010 and 5.6fb⁻¹ in 2011 of proton-proton collision data at 7 TeV, and two times one-month periods of heavy ion collisions). The SCT and Pixel Detector have been fully operational throughout all data taking periods.

The running experience will then be used to extract valuable lessons for future silicon strip detector and pixel detector projects.

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