Contribution ID: **47** Type: **not specified**

Mechanics and Construction of the LHCb Upstream Tracker Detector

Monday 23 May 2016 14:15 (30 minutes)

The LHCb Detector will undergo an upgrade during the LHC shutdown in 2019. The UT (Upgrade Tracker) is a silicon strip tracking detector being designed and constructed as part of this upgrade. The UT will provide a fast momentum measurement for the trigger as well as function as part of the overall tracking system where it will severely reduce the presence of "ghost"tracks. The UT Tracker consists of ˜1000 ˜10x10 cm2 silicon strip sensors, with custom ASIC readout chips (SALT) arranged as modules containing flex circuits and ceramic substrates. These modules are to be mounted on staves, lightweight CFRP and foam sandwich structure supports with integrated CO2 cooling. The cooling tube follows a snake-shaped routing which allows the tube to run under all the ASICs and provide efficient cooling.

The first phase of construction is now underway. The design details of the UT Tracker staves and modules will be presented, as well as construction procedures and plans. These include the latest results on design finalization, component mechanical and radiation tests, simulations of dynamical behavior, construction techniques, handling of critical surfaces, outer frame and box design, and other relevant activities.

Summary

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