

Development of pixel sensors with 25x500 μm^2 pitch for the ATLAS HL-LHC upgrade

Tuesday, September 3, 2013 10:00 AM (20 minutes)

Upgrade of the ATLAS tracker detector for high-luminosity LHC conditions requires novel approaches to the pixel sensor design. Tests of different pitch layouts represent significant part of the ATLAS upgrade program. Better momentum resolution and multiple track reconstruction in the r-phi plane could be achieved with finer phi-segmentation. The new proposed geometry adapts to the floorplan of the baseline readout ASIC geometry (50x250) but modifies the area of the sensing element. It is relevant to outer layers and high eta regions of the barrel pixel detector. Requirements to the eta resolution in these regions are not as strict as in other parts of the pixel detector. Changing the pitch from 50x250 μm^2 to 25x500 μm^2 in the outer pixel modules would improve the tracking performance of the upgraded ATLAS detector. The pixel sensors with 25x500 μm^2 readout by FE-14 chips have been designed at The University of Liverpool. The sensors were measured in the laboratory and testbeam. Results of these tests will be presented. Also, OTHER novel pixel layouts compatible with the FE-14 floorplan have been designed and produced. Their geometry characteristics will be presented.

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Track Classification: Pixels (including CCD's) - Charged particle tracking