Contribution ID: **40** Type: **not specified**

Studies of thin irradiated n-in-p planar pixel sensor at different beam incidence and characterization of the new CiS n-in-p pixel production

Wednesday 5 June 2013 10:00 (20 minutes)

Silicon pixel modules employing n-in-p planar sensors with an active thickness of 150μm were assembled with the new FE-I4 ATLAS readout chips an irradiated up to a fluence of 4e16 n_eq cmˆ-2
These thin sensors are designed as candidates for the ATLAS pixel detector upgrade at HL-LHC, as they ensure radiation hardness at high fluences.
High precision beam test measurements of the hit efficiency have been performed on these devices both at the CERN SpS and at DESY, Hamburg. We studied the behavior of these sensors at different voltage and different beam incident angles up to the maximum one expected in ATLAS for the new Insertable B-Layer and at HL-LHC.
N-in-p silicon pixel sensors with an active thickness ranging from 100μm to 300μm have been produced at CiS and interconnected to FE-I4 ATLAS chips at IZM.
We present the results of the characterization of this new production before irradiation with both test-beam measurements and laboratory measurement, using radioactive sources.

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Session Classification: Session 5: Detectors and Full Detector Systems