Contribution ID: **12** Type: **not specified**

Characterization of thin irradiated epitaxial silicon sensors for the CMS phase II pixel upgrade

Friday 5 February 2016 12:10 (20 minutes)

The high-luminosity upgrade of the Large Hadron Collider, foreseen for 2025, necessitates the replacement of the tracker of the CMS experiment. The innermost layer of the new pixel detector will be exposed to severe radiation corresponding to a 1 MeV neutron equivalent fluence up to Φ eq = 2 ·10 16 cm −2 and an ionizing dose of ≈ 10 MGy after an integrated luminosity of 3000 fb −1 . Silicon crystals grown with different methods and sensor designs are under investigation in order to optimize the sensors for such high fluences. Thin planar silicon sensors are good candidates to achieve this goal, since the degradation of the signal produced by traversing particles is less severe than for thicker devices.
Epitaxial pad diodes and strip sensors irradiated up to fluences of Φ eq = 1.3·10 16 cm −2 have been characterized in laboratory measurements and beam tests at the DESY II facility. The active thickness of the strip sensors and pad diodes is 100 µm. In addition, strip sensors produced using other growth techniques with a thickness of 200 µm have been studied.
As the noise of the sensors increases with the accumulated fluence, the track information provided by the beam telescope is used to improve the separation of signal and noise in the strip sensors measurements, hereby improving the spectra of the collected charge. In this talk, the results obtained for p-bulk sensors are shown.

Author: Mr CENTIS VIGNALI, Matteo (University of Hamburg)

Presenter: Mr CENTIS VIGNALI, Matteo (University of Hamburg)

Session Classification: Data analysis