Contribution ID: **345** Type: **Talk**

Current development status of High Voltage and High Resistivity CMOS technology for high energy physics applications

Thursday 18 February 2016 14:25 (20 minutes)

CMOS active pixel sensors are currently being investigated for a potential application in the high-energy physics experiments. The integration of the CMOS circuitry in the sensing substrate will offer substantial reduction in the material budget and manufacturing costs. Additionally, having the pre-amplifier and discriminator built-in, could eliminate the need for bump-bonding for pixel sensors, while maintaining characteristics needed for particle tracking.

Figure 1: Unit cell of the sensor with integrated CMOS circuitry

The upcoming upgrades of the LHC demand new particle tracking systems, which would be able to sustain tenfold increase in luminosity. Therefore, one of the key development aspects is to understand radiation hardness of the samples manufactured in various commercially available processes. This work will report on two different commercially available technologies: High-Voltage CMOS (fig. 1) in the AMS HV-CMOS 350nm process, and High-Resistivity CMOS in the TowerJazz HR-CMOS 180nm process.

The main areas of investigation are in-pixel charge collection efficiency, radiation hardness, uniformity and speed of the response, gain variation and pixel noise. The summary will be given of the latest results from non-irradiated and irradiated test structures up to HL-LHC strip tracking layer fluences, which reach 10^{15} n_{eq}/cm^2.

Author: KANISAUSKAS, Kestutis (University of Glasgow (GB))

Presenter: KANISAUSKAS, Kestutis (University of Glasgow (GB))

Session Classification: Semiconductor Detectors

Track Classification: Semiconductor Detectors