Contribution ID: **60** Type: **ORAL**

New results of charge multiplication in irradiated segmented silicon detectors with special strip processing

Monday 5 December 2011 10:00 (20 minutes)

The charge multiplication in severely irradiated silicon detectors is now a well proven effect that enhances the charge collection of silicon sensors making them able to operate up to at the doses anticipated for future super-colliders (like the high luminosity LHC at CERN). The effect is well documented but not completely understood. The multiplication is caused by impact ionisation due to hot electrons moving in the high electric field that develops near the junction in the irradiated sensors. The details of the electric field profile in the silicon bulk are not available due to the unknown spatial distribution of the inhomogeneous effective space charge in the hadron irradiated silicon bulk. The gradient of the effective space charge distribution is crucial to the formation of high electric field regions where the multiplication takes place. The electric field might be influenced by the implant forming the n-p junction. Deep n+ implant with different gradients could enhance or reduce the multiplication effect. A possible way to influence the multiplication process in microstrip detectors is to shape the junction implanting through a trench etched in the silicon bulk to create a much larger surface for the n+ implant. We report here the result obtained with this method before and after various doses of neutron irradiation.

Author: Dr CASSE, Gianluigi (University of Liverpool (GB))

Presenter: Dr CASSE, Gianluigi (University of Liverpool (GB))

Session Classification: Simulations and Manufacturing

Track Classification: Simulations and Manufacturing