Contribution ID: **39** Type: **not specified**

Identification of nuclear fragments using digitized signals from a partially depleted Si detector

Thursday, 19 February 2015 12:05 (20 minutes)

The performance of a silicon detector in partially depleted condition has been studied. The detector has been used for Pulse Shape (PS) identification of charged nuclear fragments. Particles entered the detector from the ohmic (low field) side, to enhance PS identification performance. Five different bias voltages have been used, one corresponding to full depletion (used as reference of the standard performance of the detector), the others associated with a silicon depleted layer ranging from 90% to 60% of the total detector thickness. Charge collection efficiency has been evaluated quantitatively and the possibility of energy calibration corrections has been considered. Collection efficiency from the not depleted region was found unexpectedly high, even for particles stopped in that region. A sudden reduction of the collection time was observed for particles having range close to the thickness of the not depleted region, indicating that the so-called "funneling" effect could play a role in charge collection. Isotopic separation capability via PS analysis improves at lower bias voltages with respect to full depletion, though charge identification thresholds are higher than at full depletion. Moreover, though the doping uniformity was not good enough for isotopic identification at full depletion, good isotopic identification via PS analysis has been obtained in partial depletion.

Primary author: Dr PASTORE, Giuseppe (INFN)

Co-author: Dr PASQUALI, Gabriele (INFN)

Presenter: Dr PASTORE, Giuseppe (INFN)

Session Classification: Non HEP projects