

Charge Collection Measurements on Dedicated RD50 Charge Multiplication SSDs

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The Collection charge of specially designed charge multiplication silicon strip detectors produced by MICRON Semiconductor Co. Ltd. within the CERN RD50 framework is investigated. Charge collection measurements are performed before and after irradiation with a proton fluence of $1e15$ and a neutron fluence ranging from $1-5e15$ 1 MeV neq /cm^2 (neq /cm^2). Structures and modifications on these devices include implants processed with increased diffusion times and energies, different sensor thicknesses, the use of intermediate biased or floating strips between the readout strips, and several different strip width and pitch geometries. The charge collection for these devices is compared to standard FZ $300 \mu\text{m}$ thick silicon strip sensors having a strip width= $25 \mu\text{m}$ and pitch= $80 \mu\text{m}$. Several sensors exhibit enhancement of the collected charge compared to the standard sensor after irradiation. Measurements include position resolve studies using an IR laser in order to investigate low and high field regions near the detector surface.

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