

Design of a silicon on insulator pixel detector using a charge sluice

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Abstract

Silicon on insulator (SOI) technology allows for the production of pixel detectors that have greater efficiency and resolution at lower costs. We have modeled an SOI detector pixel which uses the concept of a charge sluice, in which we attempt to transfer charge from one p-doped well to another, in order to reduce the parasitic capacitance while at the same time maintaining a uniform field within the device. After varying multiple parameters related to both the physical structure and voltages at the various electrodes, we have been unable to get this design to work, since the deposited charge tended to spread itself out to equalize the potentials in both wells.