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Solid state electron multiplier

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The next generation of inner tracking detectors will require spatial resolution down to 10 μ m, radiation hardness above 10e16Neq/cm² together with a temporal resolution in the order to tens of pico seconds.

To face these challenges and overcome limitations of today's technologies, an alternative approach to internal gain through the use of a radiation sensitive doping layer is investigated and simulated. An enhanced radiation hardness is foreseen by implementing additional metallic structures in the sensor substrate. These can be biased in such a way that localized high electric field are created. In this talk, TCAD and Garfield++ simulations of this proposed structure will be presented along with plans of fabrication. Gain in excess of a factor 10 can be achieved and the temporal response is similar to those of LGADs.

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