

42nd RD50 Workshop on Radiation Hard Semiconductor Devices for Very High Luminosity Colliders (Montenegro)

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Simulation of Landau fluctuations on timing performance of LGADs

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Energy deposition of highly energetic particles was simulated in LGADs with GEANT4. The simulation step was adjusted to simulate deposits over the entire detector depth in <10 μm steps. The signal formation was simulated with KDetSim using the parameters of HPK-P2 LGAD prototypes for ETL/HGTD and JSI model for impact ionization. The induced current pulses were convoluted with transfer function of typical electronics (ALTIROC ASIC). The impact of Landau fluctuations to time resolution (ToA variation) were simulated for different gains and thicknesses. Given the good agreement of results with measurements, simulations were used to estimate limits of LGAD and PIN detectors.

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