

LGAD Development at Teledyne e2v for the LHC's High-Luminosity (HL) Upgrade

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The need for 4D (fast timing) silicon particle detectors has become very apparent with the introduction of the High-Luminosity upgrade at the LHC. Timings on the order of 10's picoseconds will be required in order to fully reconstruct trajectories along the beam line where the intensity is largest and post-collision reconstruction with 3D detectors is insufficient.

The University of Oxford, University of Birmingham, the Rutherford Appleton Laboratory and the Open University are developing and testing new LGAD sensors. This project, aimed at developing UFD of characteristics and performances suitable for use at HL-LHC High Granularity Timing Detector (HGTD) is being developed in collaboration with Teledyne e2v.

The first fabricated batch of 22 six inch wafers, featuring 50 um thick high resistivity epi layer with a range of gain layer implants (dose and energy) was completed successfully.

In this talk, we'll concentrate on the LGAD design process and first IC-CV measurements carried out on wafers. Comparisons with Synopsys TCAD simulations will be shown.

Details of the wafer laser dicing along with initial measurements on individually diced LGAD and PiN devices will then be provided. Plans for next tests will also be discussed

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