



Contribution ID: 99

Type: **not specified**

Revealing distinct signals in inter-pad region of Ti-LGAD

Thursday 30 November 2023 14:20 (20 minutes)

In this presentation, we continue our investigation of charge-space profiles in segmented LGADs with a focus on double-trenched LGADs (2Tr LGAD). We compare the signal behavior of the Ti-LGAD sample with double trenches in the interpad (IP) region to that of LGADs with 2p-stops and bias rings used as isolation structures (both types produced in the Ti-LGAD RD50 batch with difference that LGADs with 2p-stops and bias ring was used as reference prototype and only produced for comparison reasons).

Our experimental results revealed two distinct types of transient current signals in IP region of TI-LGAD: “normal” or “expected” signals resembling the pad signal, and “strong” signals with broadened waveforms and higher amplitudes. We analyze the occurrence of these signals in 2Tr LGADs through extensive acquisition.

We also identify “ghost” signals that randomly appear without laser illumination. The talk explores the dependence of signal characteristics on bias voltage and laser power at different temperatures and discusses potential explanations for the observed behavior.

Only results from study on double trenched prototype from wafer W11 are presented.

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Session Classification: LGAD