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Characterization of Low Gain Avalanche Detector Gain by Means of the Transient Current Technique

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Low Gain Avalanche Detectors (LGADs) are silicon-based devices that can achieve good timing resolution due to their unique internal gain. LGADs are proposed for a wide range of fast-timing applications in high energy physics, nuclear physics, and other precision measurements of rare processes. The p-doped gain layer in an LGAD allows generation of a controlled avalanche of charge carriers, with a multiplication factor in the range 10-100. The gain is strongly dependent on the bias voltage, particularly for values close to breakdown voltage. In this study, the gain of LGADs is studied as a function of the bias voltage and as a function of the injected charge. Tests were performed with an infrared laser and a beta source to characterize the gain. Techniques developed in this study expand the characterization of LGAD performance from the case of minimum ionizing particles to the case of highly ionizing particles.

Type of presentation (in-person/online)

online presentation (zoom)

Type of presentation (I. scientific results or II. project proposal)

I. Presentation on scientific results

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