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P2.52: Advances in the TCAD modelling of non-irradiated and irradiated Low-Gain Avalanche Diode sensors

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The recently developed Low-Gain Avalanche Diode (LGAD) technology has gained growing interest within the high-energy physics (HEP) community, thanks to its capability of internal signal amplification that improves the particle detection [1]. Since the next generation of HEP experiments will require tracking detectors able to efficiently operate in environments where expected fluences will exceed 1E17 neq/cm2 [2], it is of the utmost importance the design of radiation-resistant particle detectors. To this purpose, Technology Computer-Aided Design (TCAD) simulations are a relevant part of the current detector R&D, not only to support the sensor design and optimization, but also the radiation damage understanding and modelling. In this contribution, the recent advances in the TCAD modelling of non-irradiated and irradiated LGAD sensors are presented, whose validation relies on the agreement between the simulated and experimental data - in terms of current-voltage (I-V), capacitance-voltage (C-V), and gain-voltage (G-V) characteristics, coming from devices manufactured by different foundries (e.g. HPK, FBK), and accounting for different irradiation levels and temperatures.

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