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Fundamentals of the Pulsed-Laser Technique for Single-Event Effects Testing

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Carrier generation induced by pulsed-laser excitation has become an essential tool for the investigation of single-event effects (SEEs) of micro- and nano-electronic structures. The qualitative capabilities of this approach include, among others, sensitive node identification, radiation hardened circuit verification, basic mechanisms investigations, model validation and calibration, screening devices for space missions, and fault injection to understand error propagation in complex circuits. Recent effort has built upon the success enabled by these qualitative benefits, and has focused on putting the laser SEE approaches on a more quantitative basis. This presentation will present the basic physics associated with the single-photon and two-photon excitation processes, as well as numerous case studies.

Presenters: MCMORROW, Dale (Naval Research Laboratory); BUCHNER, Stephen (Naval Research Laboratory); HALES, Joel (Naval Research Laboratory); ILDEFONSO, Adrian (US Naval Research Laboratory); POUGET, Vincent (Université de Montpellier/CNRS); FOUILLET, Pascal (Université de Bordeaux); KHACHATRIAN, Ani (US Naval Research Laboratory)