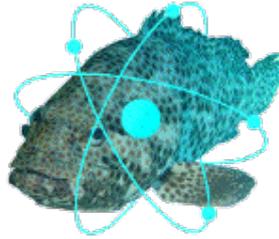


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## **MEFISIG : Modelling irradiated electronic components used in space industry**

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The SEE (Single Event Effect) problematic in electronic components used in space industry is assessed using a Monte Carlo method. This work is focused on modelling two different structures of 18nm-transistors to simulate the transport of ionising particles through the components using C++'s toolkit Geant4. Single Event Transients (SET) are particular cases of SEE that can cause voltage spikes at a node in a circuit and that can be produced by an incident ionising particle. Several hardening methods (i.e. physical shielding) already exist to reduce the effects of these incidents but there is a need to predict SET in order to know their probability of occurrence and estimate the global lifetime of the devices. SET have been studied using Spice simulations by introducing arbitrary voltage sources (time constants and charge) to emulate the voltage spikes occurring at a node. Time constants can be approximated but the problem lies with the amount of free charges created by ionisation linked to an incident particle. Using Geant4 as simulation tool to evaluate the electron production in the components it can be possible to get good approximation values for the extra charge input. In this paper, we introduce preliminary results concerning electron production in the depletion zone of a transistor depending on the physics table used in Geant4 and depending on the strike angle as a first step in the reliability study of the model created. Once the model reliability is completely assessed, it will be possible to couple Geant4's output with TCAD softwares in order to perform fully-physical simulations of the devices including its electronic response following a single particle strike.

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