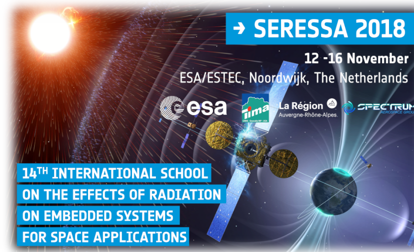

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Single Event Effects Induced by Heavy Ion and Single Photon Pulsed Laser Irradiation on Atom Switch based Field Programmable Gate Array

Single event effects (SEEs) of atom switches (ASs) embedded on 40-nm complementary metal oxide semiconductor (CMOS) were investigated with both heavy ion and pulsed laser irradiation. In the evaluation of atom switch-based field programmable Gate Array (AS-FPGA), ASs showed immunity against the irradiation and there was no change of the state of ASs both in a cross-bar switch and memory in look up tables (LUTs). It is supposed that ASs do not make any single event transients (SETs) noise when the ions hit. However, n-type metal oxide semiconductor field effect transistors (nMOSFETs) to program the ASs in the CMOS layer showed prolonged SETs against heavy ions hit. New approaches to solve the SET in CMOS are proposed in this paper, especially for AS-FPGA application.

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