



## **Radiation Effects in Semiconductors (Devices, Circuits, and Systems)**

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Space applications, nuclear physics, military operations, medical imaging, and especially electronics (modern silicon processing) are obvious fields in which radiation damage can have serious consequences, i.e., degradation of MOS devices and circuits. Zeroing in on vital aspects of this broad and complex topic, **Radiation Effects in Semiconductors** addresses the ever-growing need for a clear understanding of radiation effects on semiconductor devices and circuits to combat potential damage it can cause.

**Features a chapter authored by renowned radiation authority Lawrence T. Clark on *Radiation Hardened by Design SRAM Strategies for TID and SEE Mitigation***

This book analyzes the radiation problem, focusing on the most important aspects required for comprehending the degrading effects observed in semiconductor devices, circuits, and systems when they are irradiated. It explores how radiation interacts with solid materials, providing a detailed analysis of three ways this occurs: *Photoelectric effect*, *Compton effect*, and *creation of electron-positron pairs*. The author explains that the probability of these three effects occurring depends on the energy of the incident photon and the atomic number of the target. The book also discusses the effects that photons can have on matter—in terms of ionization effects and nuclear displacement

Written for post-graduate researchers, semiconductor engineers, and nuclear and space engineers with some electronics background, this carefully constructed reference explains how ionizing radiation is creating damage in semiconducting devices and circuits and systems—and how that damage can be avoided in areas such as military/space missions, nuclear applications, plasma damage, and X-ray-based techniques. It features top-notch international experts in industry and academia who address emerging detector technologies, circuit design techniques, new materials, and innovative system approaches.

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