



# Soft Error Mechanisms, Modeling and Mitigation

By Selahattin Sayil

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## Soft Error Mechanisms, Modeling and Mitigation By Selahattin Sayil

This book introduces readers to various radiation soft-error mechanisms such as soft delays, radiation induced clock jitter and pulses, and single event (SE) coupling induced effects. In addition to discussing various radiation hardening techniques for combinational logic, the author also describes new mitigation strategies targeting commercial designs. Coverage includes novel soft error mitigation techniques such as the Dynamic Threshold Technique and Soft Error Filtering based on Transmission gate with varied gate and body bias. The discussion also includes modeling of SE crosstalk noise, delay and speed-up effects. Various mitigation strategies to eliminate SE coupling effects are also introduced. Coverage also includes the reliability of low power energy-efficient designs and the impact of leakage power consumption optimizations on soft error robustness. The author presents an analysis of various power optimization techniques, enabling readers to make design choices that reduce static power consumption and improve soft error reliability at the same time.

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### **About the Author**

Dr. Selahattin Sayil is an Associate Professor in the Philip M. Drayer Department of Electrical Engineering at Lamar University. His research focuses on Radiation effects modeling and hardening at the circuit level, Reliability analysis of low power designs, and Interconnect modeling and noise prediction.

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