

Seminar On

Space Radiation Reliability Issues in Modern Semiconductor Devices and Circuits

Professor Xiaoyu Pan

College of Integrated Circuits

Nanjing University of Aeronautics and Astronautics, China

Date : 19 December 2025 (Friday)

Time : 11:00 am – 12:00 nn

Venue : Room 15-202, 15/F, State Key Laboratory of Terahertz and Millimeter Waves,
Lau Ming Wai Academic Building, City University of Hong Kong

Abstract

With the rapid development of global commercial space activities and deep-space exploration missions, radiation effects on semiconductor devices and circuits used in space applications have attracted increasing attention. This presentation begins with an overview of the space radiation environment, including its major sources and classifications, such as single-event effect (SEE) and total ionizing dose (TID) effect, along with a brief introduction to their underlying physical mechanisms. Subsequently, the presentation systematically reviews the primary experimental test scenarios and simulation tools commonly employed in space radiation effects research. The speaker introduces recent research progress in the investigation of radiation effect mechanisms and radiation-hardening techniques. Particular emphasis is placed on the SEE sensitivities and hardening strategies of SiGe RF devices and circuits, as well as CMOS-based memories and processors. In addition, emerging applications of artificial intelligence in radiation effects modeling, characterization, and mitigation are discussed. Finally, the presentation concludes with a brief discussion on future research directions in this field.

Biography



Dr. Xiaoyu Pan received his Ph.D. degree from Tsinghua University. He is currently an Associate Professor with the College of Integrated Circuits, Nanjing University of Aeronautics and Astronautics (NUAA), where he also serves as the Deputy Head of the Department of Analog Integrated Circuits and Microsystems. Dr. Pan has long been engaged in research on space radiation effects on semiconductor devices and circuits. He has presided over multiple national and provincial-level research projects as the Principal Investigator and participated in several National Science and Technology Major Projects. His research interests focus on the radiation mechanisms and hardening methodologies for RF circuits (RF front-ends) and digital circuits (memories and processors), with extensive practical experience in both experimental testing and simulation. In recent years, Dr. Pan has published more than ten SCI journal and international conference papers as the first author and holds 5 Chinese patents. He received the "Best Student Paper Award" at the IWRMN-EDHE (2017), the "Best Paper Award" at ICREED (2025), and the First Prize of Science and Technology Progress Award from the China Society of Radiation Protection (2023).

*** ALL ARE WELCOME ***

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