

Technical Seminar

Multiphysics Method for High-Power Electromagnetics

Speaker: Professor Wen-Yan Yin, Qiu Shi Chair Professor, Centre for Optical and Electromagnetic Research, Zhejiang University, China.

Time/Date: 3:00 pm to 4:30 pm, Wednesday, May 11, 2011.

Venue: Sapienza Università di Roma - Dip. di Ingegneria Astronautica, Elettrica ed Energetica, Sala Riunioni – Via delle Sette Sale 12b.

Abstract: We are now facing considerably concerns on intentional and non-intentional electromagnetic interferences (IEMI & EMI) issues related to various communication platforms, which can cause serious degradation in reliability of devices, circuits and systems. In this talk, multiphysics-based time-domain finite element method will be introduced and implemented for fast capturing transient electro-thermo-mechanical responses of various on-chip interconnects, devices and circuits under the impact of an (I)EMI signal, such as double-exponential high-power EMP and electrostatic discharge(ESD), etc.

Outline:

1. Background: Increased concern at (I)EMI effects in advanced communication platforms.
2. Classification of high-power and ultra wideband (I)EMI signals.
3. Experimental observation of temperature effect on the performance degradation of interconnects & passive devices.
4. Experimental observation of electro-thermo-mechanical breakdown events of active devices.
5. Introduction of multiphysics-based time-domain finite element method and its algorithm realization.
6. Nonlinear electro-thermo-mechanical responses of silicon-based passive devices under the impact of an (I)EMI.
7. Nonlinear electro-thermal response of active devices under the impact of an (I)EMI.
8. Conclusion.

About the Speaker: *Wen-Yan Yin* received his M.Sc. degree from Xidian University in 1989 and Ph.D. degree from Xi'an Jiaotong University in 1994. He worked in the Department of Electronic Engineering, Northwestern Polytechnic University as an Associate Professor from 1993 to 1996. He was a Research Fellow with the Department of Electrical Engineering at Duisburg University, granted by the Alexander von Humboldt-Stiftung of Germany from 1996 to 1998. Since Dec.1998, he has been with the MMIC Modeling and Packing Lab, Department of ECE of National University of Singapore (NUS) as a Research Fellow. In March 2002, he joined the Temasek Laboratories of NUS, as a Research Scientist. From April 2005 to Dec.2008, he was with the School of Electronic Information and Electrical Engineering, as a Professor of Shanghai Jiao Tong University (SJTU). He was also the Director of Center for Microwave and RF Technologies (CMRFT) of SJTU. From Jan. 2009 to now, he is the "Qiu Shi" Chair Professor of Zhejiang University (ZJU), working at the Centre for Optical and Electromagnetic Research, National State Key Lab of MOI, ZJU of China. He is also the adjunct Professor of CMRFT, SJTU. His main research interests are in the development of modeling techniques for passive and active RF and millimeter wave device and circuits, nanoelectronics, electromagnetic compatibility (EMC) and electromagnetic protection (EMP) of communication platforms, computational multiphysics methods and its applications. He has published more than 180 international journal articles (including one international book, 15 book chapters and more than sixty IEEE Papers). One chapter of "Complex Media" is included in the Encyclopedia of RF and Microwave Engineering, published in 2005 by John Wiley & Sons, Inc. Dr. Yin is the IEEE EMC Society Distinguished Lecturer from 2011 to 2012, General Co-Chair of IEEE EDAPS'2011. He received the Science and Technology Promotion Award of the first class from the local Shanghai government of China in 2005, the Technology Invention Award of the first class from the Educational Ministry of China in 2007, the National Technology Invention Award of the second class from Chinese government in 2008, and the Best Paper Award of APEMC'2008.

Contact Person: Marcello D'Amore (marcello.damore@uniroma1.it)