

Multiphysics Modelling and Simulation: Opportunities, Challenges and Applications

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Abstract:

Multiphysics modelling and simulation methods have been widely adopted in many key areas, such as thermal management of high-power RF devices and transceivers for wireless communication, two- to three-dimensional integrated circuits, new generation memory arrays, and electromagnetic protection of communication & radar systems in aerospace-based platform, *etc.* However, multiphysics modeling and simulation methods, in comparison with single-field simulation, remain a lot of very challenging tasks even with nowadays.

This speech will introduce multiphysics modelling and simulation activities carried out at EIEI of Zhejiang University, China recently. Including multiphysics modeling and simulation at different scales, *i.e.* from nanoscale devices to circuit and chip levels; challenges in the development of algorithms with large-scale parallel simulation capability; and high performance computing (HPC) for multiscale and multiphysics simulation. Also, some typical applications will be addressed for successful multiphysics compatibility design of RF packaging and protection, *etc.*

Biographies:



Wen-Yan Yin (F'13) received the M. S. degree in electromagnetic fields and microwave techniques from Xidian University, Xi'an, China, in 1989, and the Ph.D. degree in electrical engineering from Xi'an Jiao Tong University, Xi'an, China, in 1994.

From 1993 to 1996, he was an Associate Professor in the Department of Electronic Engineering, Northwestern Polytechnic University (NPU), Xi'an, China. From 1996 to 1998, he was the AvH Research Fellow in the Department of Electronic Engineering, Duisburg University, Germany. From Dec. 1998 to Oct. 2005, he was with the National University of Singapore (NUS), Singapore, as a

Research Scientist. From April 2005 to Dec.2008, he was a Professor in the School of Electronic Information and Electrical Engineering, Shanghai Jiao Tong University (SJTU), Shanghai, China, where he is currently an adjunct Ph.D. candidate supervisor with the Center for Microwave and RF Technologies of SJTU. Since Jan. 2009, he has been with the Zhejiang University (ZJU), Hangzhou, China, as a “Qiu Shi” Distinguished Professor. He is now the director of the Innovative Institute of Electromagnetic Information and Electronic Integration (EIEI), College of Information Science and Electronic Engineering (ISEE) of ZJU.

As a Leading author, he has published more than 270 international journal papers (about 180 IEEE papers), including 1 international book and several book chapters. His main research interests are in the fields of computational electromagnetics & multiphysics methods and software development, high-power electromagnetic radiation effects, electromagnetic compatibility (EMC) design of communication systems and platforms, nanoelectronics, 3DIC and advanced packaging.

Dr. Yin has been selected as IEEE Fellow in 2013 for contribution of *multiphysics solution to intentional electromagnetic interference and nanostructure electromagnetic compatibility*. He is now the Associate Editor of *IEEE Trans. Components, Packaging, and Manufacturing Technology*, and the Associate Editor of *IEEE Journal of Multiscale and Multiphysics Computational Techniques*. From 2011 to 2012, he was an *IEEE EMC Society Distinguished Lecturer*. From Jan.2013 to Dec.2016, he was the *IEEE EMC Society Shanghai Chapter Chair*. From Jan.2011 to Dec.2016, he was an Associate Editor and Guest Editor of the *International Journal of Electronic Networks, Devices, and Fields*. He was also an editorial board member of *International Journal of RF and Microwave Computer-Aided Engineering* from Jan.2012 to Dec.2014. He was the General Co-Chair of the 2017 IEEE Electrical Design of Advanced Packaging and Systems Symposium (IEEE EDAPS' 2017), sponsored by the IEEE Electronic Packaging Committee. He was also the Co-Chair of EDAPS' 2006 and 2011, respectively.

He received the Science and Technology Progress Award of the First Class from the local Shanghai Government of China in 2005 and 2011, respectively, the National Technology Invention Award of the Second Class from the Chinese Government in 2008, the Science and Technology Progress Award of the Second Class of China in 2012, and several Best Paper Awards of some international conferences.