

Special Issue on  
**Advanced Modeling and Simulation Methods for  
Multiphysics and Multiscale Problems**

# CALL FOR PAPERS

Since the pioneering effort on computational electromagnetics (CEM) in the late 1950s, many computational methods have been developed for solving Maxwell's equations for electromagnetic (EM) problems, ranging from being full wave to being asymptotic, from frequency-domain to time-domain, and from integral equation to partial differential equation based ones. Due to their modeling accuracy and simulation efficiency, these methods have been applied successfully to a wide range of scientific and engineering problems and have become indispensable investigation methods for scientists and standard designing tools for engineers.

While great success has been achieved in EM modeling and simulation, the time has come to tackle much more challenging multiphysics and multiscale problems, which have a greater range of applications in sciences and technologies. Problems that involve large-scale and multiscale features in both space and time, that are nonlinear and multiphysics in nature, and that lack unique solutions for mathematical or engineering reasons are encountered routinely in many applications such as the EM, thermal, and structural designing of integrated circuits and packages, the micro-, meso-, and macroscopic modeling of novel and artificial materials, the simulation of large-scale antenna arrays mounted on large platforms, the deterministic and stochastic investigation of EM and particle interactions in high-power devices, the analysis of EM compatibility in complex environments, and the optimization of geometrical and material parameters in inverse problems. Because of the added complexities induced by these applications, more advanced methods that have stronger modeling capability and reliability, higher simulation accuracy and efficiency, and better numerical flexibility and robustness are greatly needed.

To promote the continuing research that addresses these challenges, we invite investigators to contribute high-quality, original research papers as well as review articles that discuss the recent progress in the development of advanced modeling and simulation methods for multiphysics and multiscale problems.

Potential topics include but are not limited to the following:

- ▶ Novel models and formulations for multiphysics and multiscale problems
- ▶ Domain decomposition methods and multisolver schemes
- ▶ Novel and efficient temporal and spatial coupling schemes
- ▶ Nonlinear modeling and simulation methods
- ▶ Higher-order and multiresolution basis functions for multiscale problems
- ▶ Parallel computation techniques on both CPU and GPU platforms
- ▶ Hybrid methods for multiphysics and multiscale problems

Authors can submit their manuscripts through the Manuscript Tracking System at <http://mts.hindawi.com/submit/journals/ijap/aemsm/>.

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