

# Computational Methods for Electromagnetic Phenomena

A unique and comprehensive graduate text and reference on numerical methods for electromagnetic phenomena, from atomistic to continuum scales, in biology, micro-to-optical waves, photonics, nanoelectronics, and plasmas.

The state-of-the-art numerical methods described include:

- Statistical fluctuation formula for the dielectric constant
- Particle-Mesh-Ewald, Fast-Multipole-Method, and image-based reaction field method for long-range interactions
- High-order singular/hypersingular (Nyström collocation/Galerkin) boundary and volume integral methods in layered media for Poisson–Boltzmann electrostatics, electromagnetic wave scattering, and electron density waves in quantum dots
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- High-order WENO and Godunov and central schemes for hydrodynamics transport
- Vlasov–Fokker–Planck, PIC, and constrained MHD transport in plasmas

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