SYPC 2 Symposium "Photonic Crystals" II

Zeit: Mittwoch 16:30–17:30 Raum: HV

Hauptvortrag

SYPC 2.1 Mi 16:30 HV

Computational Nanophotonics — •Jerome V. Moloney — Arizona Center for Mathematical Sciences and Optical Sciences Center, University of Arizona, Tucson, AZ 85721, USA

Physically and mathematically self-consistent modeling and large-scale computer simulation are emerging as powerful design tools of current and future complex nanophotonic systems. In the talk, I will motivate the need for such simulation approaches in the context of modeling micro- and nano-scale optical systems. The rapidly emerging field of nanophotonics is spurring applications in on-chip nanocircuitry, optical data storage, sensing, cancer diagnostics, etc. Solving the time-domain Maxwell's equations in 3D offers huge computational challenges especially when the problem at hand involves widely disparate space scales. I will describe a space and time mesh refinement scheme that promises to make the simulation of large 3D nanophotonics systems with present supercomputing systems feasible. The adaptive space and time mesh refinement approach will be illustrated with applications to surface plasmon excitation of metallic spheres, coupling of quantum dot exciton features and 3D photonics crystal defect modes and the interaction of light with metamaterials constructed from nanoscale metallic and dielectric features.

Hauptvortrag

SYPC 2.2 Mi 17:00 HV

From Metamaterials to Photonic Crystals — •Stefan Linden[1], Martin Wegener[1,2], Christian Enkrich[2], Gunnar Dolling[2], Nils Feth[2], Matthias W. Klein[2], Manuel Decker[2], Costas M. Soukoulis[3], Sven Burger[4], and Frank Schmidt[4] — [1]Institut für Nanotechnologie, Forschungszentrum Karlsruhe, Germany — [2]Institut für Angewandte Physik, Universität Karlsruhe (TH), Germany — [3]Ames Laboratory and Department of Physics and Astronomy, Iowa State University, U.S.A. — [4]Zuse Institut Berlin, Germany

The optical properties of metamaterials are mainly governed by the shape and composition of their "articial atoms." For example, "magnetic atoms" (e.g., split-ring resonators) allow for magnetic dipoles at optical frequencies. Here, we review our recent work on "magnetic atoms" for photonic metamaterials and investigate the unusual properties of photonic crystals composed of such "magnetic atoms."