Computational Studies of Light Interactions with Metallic Nanostructures

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Abstract

Several approaches to modeling light interactions with metallic nanostructures, as well as hybrid structures containing semiconductor quantum dots are outlined. Purely classical electrodynamics in the form of the finite-difference time-domain (FDTD) method is shown to be a robust and flexible tool for modeling complex nanostructures [1]. Illustrations involving the excitation of gold bipyramdal and cubic particles are given. Hybrid systems corresponding to quantum dots and metal nanoparticles [2, 3] are also discussed from the point of view of classical, semiclassical and fully quantum mechanical approaches. Finally, explicit time-dependent configuration interaction studies of light interacting with atomic chains are discussed, revealing a new type of plasmon excitation termed the excited state plasmon [4].

References:

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