Abstract Submitted
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Collective Plasmon Resonances and Their Influence on Metallic Nanostructures[1] PING CHU, DOUGLAS L. MILLS, University of California, Irvine — We present theoretical studies of the influence of collective plasmon resonances and their influence on enhanced fields, laser induced forces and related issues in selected examples of metallic nanostructures. Our new calculations focus on two nearby dissimilar nanospheres, and on nanospheres near a planar substrate. We show that when the response of two dissimilar spheres is compared to that of two isolated spheres, breakdown of a selection rule greatly increases the spectral range over which laser fields may couple to collective plasmons. We shall illustrate this with several selected examples. Collective plasmons also influence zero point fluctuations in the electric field near nanostructures; these produce non radiative transitions and energy level shifts within nearby molecules[1]. We shall present studies of the spatial distribution and frequency spectra of plasmon enhanced zero point fluctuations, with the near vicinity of STM tips in mind. [1] D. L. Mills, J. X. Cao and R. Wu, Phys. Rev B75, 214404, (2007).

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