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Interparticle and Interfacial Effects on Second Harmonic Generation from Gold Nanoparticles MATTHEW MCMAHON, DAVON FERRARA, RICHARD HAGLUND, Vanderbilt University — We have studied the angular dependence of second-harmonic generation (SHG) from symmetric gold nanoparticles arranged in lithographically fabricated gratings. For example, we have measured the effects of electric-field enhancement on second-harmonic generation by controlling the separation between closely spaced nanoparticles; changing the separation should change the strength of the interaction. Near-field interparticle interactions are observed to have characteristic effects on both the extinction spectra and the second-harmonic signals. Moreover, the substrate plays an important role in the way dipoles and higher-order multipoles contribute to the harmonic radiation. We have computed the dipole and quadrupole contributions in order to fit the measured SHG angular distributions. Theoretically, however, most of the harmonic light should be radiated into the substrate rather than into free space, making waveguiding applications particularly intriguing.

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