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Nonlinear Effects in Gold Nanocrescent Antennas ELENA DROBNYH, MAXIM SUKHAREV, Arizona State University — Plasmonic nanostructures can manipulate light in a well-controlled manner. To fabricate them efficiently a detailed understanding of nonlinear responses from nanostructures with characterized localized surface plasmon resonance (LSPR) is vital. We investigate the nonlinear response from gold nanocrescent antennas which have wavelength and polarization-sensitive LSPRs in the visible and near-infrared wavelength range. Coupling Maxwells equations to the nonlinear hydrodynamic model for metal and utilizing a fully vectorial three-dimensional approach we analyze linear transmission, reflection, and nonlinear power spectra. It is shown that the effects of higher-order LSPRs, such as quadrupole and multipole resonances that occur at second harmonic (SH) wavelengths are important in governing the SH generation process. Also, the results indicate that the nanoscale variations of the nanocrescents shape plays an important role in the dependency of SH signals from the incident polarization angle.

Elena Drobnyh
Arizona State University

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