Abstract Submitted
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Nonlinear Plasmonics of Gold Nanospirals RODERICK B. DAVIDSON, II, JED I. ZIEGLER, Vanderbilt University Physics Department, GUILLERMO VARGAS, Prarie View A&M University Physics Department, RICHARD F. HAGLUND, JR., Vanderbilt University Physics Department, APPLIED OPTICAL PHYSICS GROUP TEAM — Archimedean nanospirals have been shown to have complex optical interactions characterized by wavelength- and polarization-sensitive intraparticle resonances. Due to their lack of any axis of inversion symmetry, nanospirals should also exhibit highly nonlinear behavior, such as second- and third-harmonic generation. The gold nanospirals in these experiments were created using electron beam lithography; the 4π nanospirals have overall dimensions below 500 nm. The characteristic angular dependence of second harmonic emission (SHG) as a function of polarization angle is observed for linearly polarized light. The differences in SHG emission using linear and circular polarized excitation are also explored. Through these measurements we will characterize the strength of the second-order nonlinearity of the gold nanospirals relative to GaAs calibration materials. These measurements characterize an efficient second order non linear nanoparticle that does not have to meet the phase matching requirements of nonlinear crystals.

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