Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Plasmon responses and optical chirality of helical nanoparticle assemblies[1] ZHIYUAN FAN, ALEXANDER GOVOROV, Department of Physics and Astronomy, Ohio University, Athens, Ohio 45701, United States, OHIO UNIVERSITY TEAM — Helical gold nanoparticle assemblies exhibit strong circular dichorism (CD) in the plasmonic band. This CD effect comes from dipolar Coulomb and electromagnetic interactions between spherical gold nanoparticles. A typical CD spectrum of chiral plasmonic assembly includes positive and negative bands. The shape of CD spectra is sensitive to geometrical parameters of the assembly. In this study, we show that the CD signal is stable against structural defects, which makes experimental realizations of strong CD effect feasible. To date, several recent experimental papers reported CD effects in helical plasmonic systems. In addition, we found that the sign of CD signal can flip as a function of the inter-particle distance and, for very long helices, the long-range electrodynamic interactions become essential. These results are important for designing nanocomposite materials with strong optical chirality in the visible wavelength range.

[1]This work was supported by Volkswagen Foundation and NSF (project number CBET-0933415)

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Date submitted: 27 Nov 2011 Electronic form version 1.4