Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Bi-anisotropy in a metallic nanoparticle ring[1] LIUYANG SUN, TZUHSUAN MA, SEUNG-CHEOL YANG, The University of Texas at Austin, JINWEI SHI, Beijing Normal University, IRVING MARTINEZ, The University of Uexas at El Paso, GAEHANG LEE, Korea Basic Science Institute, GI-RA YI, Sungkyunkwan Universtiy, GENNADY SHVETS, XIAOQIN LI, The University of Texas at Austin — Optical bi-anisotropy refers to magnetoelectric coupling effect, where electric (magnetic) polarization is excited by magnetic (electric) field of the incident light, and the induced polarization and incident field are at different directions. In the field of metamaterials, bi-anisotropy effects have been previously examined in various systems with broken symmetry, such as split rings and Pi-shaped or S-shaped resonators. We investigate bi-anisotropy in the visible frequency range in an asymmetric nano-ring system consisting of four nearly identical gold nanoparticles, in which electric and magnetic dipoles interact with each other. We arrange the nanoparticles into a designed ring geometry using atomic force microscopy manipulation method. Using dark field scattering spectroscopy, we observe that the magnetic dipole is either enhanced or suppressed under different excitation conditions. These results are relevant in designing negative index metamaterials, nano-sensors and other plasmonic devices.

[1]We acknowledge NSF and AFOSR

Liuyang Sun
The University of Texas at Austin

Date submitted: 14 Nov 2014 Electronic form version 1.4