

Magnetic Dipolar Coupling in Gold Nanosphere Dimers

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Abstract

In this talk, I will present the first-ever observation of a magnetic dipolar contribution to the nonlinear optical (NLO) response of colloidal plasmonic nanostructures. The second-order NLO response from individual solid gold nanosphere (SGN) dimers was probed polarization-resolved second harmonic generation (SHG) spectroscopy at the single-particle level. Unambiguous circular dichroism (CD) in the SH signal was observed for SGN dimers, indicating that the interfacial plasmon field (located within the inter-particle gap) was chiral. The origin of this effect was probed by continuous polarization variation (CPV) SHG measurements. Detailed analysis of the polarization line shapes of the SH intensities obtained through CPV measurements revealed that the CD effect resulted from strong magnetic-dipole contributions to the nanostructure's optical properties.