Abstract Submitted
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Determining 3D Relative Orientation between Plasmonic Nanosparticles[1] FARBOD SHAFIEI, CHIHHUI WU, PATRICK PUTZKE, YANWEN WU, AKSHAY SINGH, GENNADY SHVETS, XIAOQIN LI, University of Texas at Austin — Polarization resolved far-field scattering measurements were used to determine 3D relative orientation between plasmonic nanosparticles placed few nanometers apart. The metallic nanostructure was assembled using the atomic force microscope (AFM) nanomanipulation method. When a gold nanosphere (150 nm in diameter) was placed within a few nanometers to the end of a gold nanorod (20 nm in diameter and 180 nm in length), near field coupling between them introduced new features in the scattering spectra. Specifically, a Fano resonance emerged, due to the interference between a dark mode, corresponding to the quadrupole charge distribution on the rod, and the bright, dipole mode of the sphere. As linear polarizer in the path of the incident and emission light was rotated, the scattering spectra evolve systematically, enabling us to determine the 3D relative orientation between these two plasmonic nanoparticles. This orientation information cannot be accurately and dynamically obtained using other scanning probe techniques, especially when one nanoparticle is partially hidden under the other nanoparticles.

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