Abstract Submitted
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Single Metal Nanoparticle Optical Interference SANG-KEE EAH[1], The University of Chicago, HEINRICH M. JAEGER, NORBERT F. SCHERER, The University of Chicago, GARY P. WIEDERRECHT, XIAO-MIN LIN, Argonne National Laboratory — Optical interference of plasmon light scattering from a single gold nanoparticle is experimentally observed by placing a plane mirror nearby. The unique interference patterns in both spatial and spectral domians are reproduced by simulations based on the Huygens-Fresnel diffraction theory. The large spectral resonance enables us to determine the distance to the mirror with a 10 nm resolution without scanning the mirror [1]. The image dipole from a spherical mirror's reflection interferes with the real dipole of a single gold nanoparticle attached to an optical fiber tip [2], resulting in enhancement and inhibition of the resonant scattering rate by the modulation in the scattered light intensity collected outside the interference solid angle. [1] S.-K. Eah, H.M. Jaeger, N.F. Scherer, G.P. Wiederrecht, & X.-M. Lin, submitted to Phys. Rev. Lett. (Nov. 2004). [2] S.-K. Eah, H.M. Jaeger, N.F. Scherer, G.P. Wiederrecht, & X.- M. Lin, Appl. Phys. Lett. (in press).

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