

Abstract Submitted
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On and Off Phonon Resonance Imaging of Silica Capped Gold Nanoparticles and Silica Nanoparticles by Infrared Near-Field Microscopy BRANDON HESSLER, JERRY OCHOA, ZACH NUNO, YOHANNES ABATE, California State University Long Beach — Phonon resonant silicon dioxide (SiO₂) nanoparticles and SiO₂ coated gold nanoparticles were imaged using optical near-field microscopy in the infrared. Both the near-field amplitude and phases were obtained as a function of infrared wavelength. Locally excited silicon dioxide phonon polariton resonances occur around 9.26 micro meters. Experimental results are in good agreement with dielectric function model calculations for these particles in the extended dipole approximation. These results show that the phase signal intensity of the capped particles is stronger than the silica particles (by a factor of about 3) at resonance due to the effect of the highly reflective gold core. Since the near-field phase is proportional to the absorption cross-section of a particle, these results can be used to quantify the effect of a highly reflective surface on the absorptive properties of thin films.

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