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Research Summary:

Current research focuses on understanding and controlling the flow of energy after light is absorbed by metal and semiconductor nanoparticles, and by hybrid assemblies of these nanoparticles. A central goal is the development of nanomaterials with new optical and physical properties that emerge from strong, coherent interactions among the components. The central experimental effort is built around single-particle optical microscopy and ultrafast laser spectroscopy.

Selected Recent Publications:

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M. Pelton, Y. Tang, and F. Stellacci, "Long-lived charge-separated states in ligand-stabilized silver clusters," J. Am. Chem. Soc. 134, 11856 (2012).

Z. Yan. J. E. Jureller, J. Sweet, M. J. Guffey, M. Pelton, and N. F. Scherer, "Three-dimensional optical trapping and manipulation of single silver nanowires," Nano Lett. 12, 5155 (2012).

B. Wild, L. Cao, Y. Sun, B. P. Khanal, E. R. Zubarev, S. K. Gray, N. F. Scherer, and M. Pelton, "Propagation lengths and group velocities of plasmons in chemically synthesized gold and silver nanowires," ACS Nano 6, 472 (2012).

H. McDaniel, M. Pelton, N. Oh, and M. Shim, "Effects of lattice strain and band offset on electron transfer rates in type-II nanorod heterostructures," J. Phys. Chem. Lett. 3, 1024 (2012).

C. She, A. Demortière, E. V. Schevchenko, and M. Pelton, "Using shape to control photoluminescence from CdSe/CdS core/shell nanorods," J. Phys. Chem. Lett. 2, 1469 (2011).

M. Pelton, Y. Wang, D. Gosztola, and J. E. Sader, “Fluid damping of acoustic vibrations in bipyramidal gold nanoparticles,” J. Phys. Chem. C. 115, 23732 (2011).

A. E. DePrince, III, M. Pelton, J. R. Guest, and S. K. Gray, “Emergence of excited-state plasmon modes in linear hydrogen chains from time-dependent quantum mechanical methods,” Phys. Rev. Lett. 107, 196806 (2011).

X. Wu, S. K. Gray, and M. Pelton, “Quantum-dot-induced transparency in a nanoscale plasmonic resonator,” Opt. Express 18, 23633 (2010).

Y. Wang, A. E. DePrince, III, S. K. Gray, X.-M. Lin, and M. Pelton, “Solvent-mediated end-to-end assembly of gold nanorods,” J. Phys. Chem. Lett. 1, 2692 (2010).

M. Pelton, J. Burgin, M. Liu, P. Guyot-Sionnest, and D. Gosztola, “Damping of acoustic vibrations in gold nanoparticles,” Nature Nanotech. 4, 492 (2009).

X. Wu, Y. Sun, and M. Pelton, “Recombination rates for single colloidal quantum dots near a smooth metal film,” Phys. Chem. Chem. Phys. 11, 5867 (2009).

M. Liu, T.-W. Lee, S. K. Gray, P. Guyot-Sionnest, and M. Pelton, “Excitation of dark plasmons in metal nanostructures by a localized emitter,” Phys. Rev. Lett 102, 107401 (2009).

M. Pelton, J. Aizpurua, and G. W. Bryant, “Metal-nanoparticle plasmonics,” Laser Photonics Rev. 2, 135 (2008).

I. Jung, M. Pelton, R. Piner, D. A. Dikin, S. Stankovich, S. Watcharotone, M. Hausner, and R. S. Ruoff, “Simple approach for high-contrast optical imaging and characterization of graphene-based sheets,” Nano Lett. 7, 3569 (2007).

M. Pelton, G. Smith, N. F. Scherer, and R. A. Marcus, “Evidence for a diffusioncontrolled mechanism for fluorescence blinking of colloidal quantum dots,” Proc. Natl. Acad. Sci. USA 104, 14249 (2007).

M. Pelton, M. Liu, S. Park, P. Guyot-Sionnest, and N. F. Scherer, “Ultrafast resonant optical scattering from single gold nanorods: Large nonlinearities and plasmon saturation,” Phys. Rev. B 73, 155419 (2006).

M. Pelton, C. Santori, J. Vuckovic, B.-Y. Zhang, G. S. Solomon, J. Plant, and Y. Yamamoto, “Efficient source of single photons: A single quantum dot in a micropost microcavity,” Phys. Rev. Lett. 89, 233602 (2002).