

Abstract Submitted
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Ultrafast pump-probe measurements of thermal transport in nanospheres BRIAN GREEN, MARK SIEMENS, University of Denver — Macroscopic thermal transport is explained by classical thermal diffusion, but as nanostructure length scales approach the phonon mean free path, thermal transport is no longer diffusive, but ballistic in character. We present experimental measurements in which we time-resolve the cooling dynamics of gold nanospheres approximately 100 nm in diameter on a glass substrate. We use a transient thermoreflectance technique, utilizing a near-infrared ultrafast pulsed laser in collinear pump/probe experiments. The measured thermal dynamics show sub-picosecond heating and a biexponential decay. Fitting these experimental data with a diffusive thermal transport model provides physical insight into the relevant length and time scales in these nanostructured systems.

Brian Green
University of Denver

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