

# Physical Chemistry Seminar

Tuesday,  
October 16, 2012

11:00 am

Room 1315  
Chemistry Building

## Transient absorption microscopy studies of single metal and semiconductor nanostructures



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Host: Professor Randy Goldsmith

Single particle spectroscopy is a powerful tool for studying the optical properties of nanomaterials. It is capable of revealing information about how differences in size, shape and environment affect properties – which is often hidden in ensemble measurements. Usually these experiments are implemented by detecting emission – which makes it difficult to study fast (sub-ps) process, or materials with low quantum yields (such as metals or semiconductor nanowires). In this talk I will present results from transient absorption experiments performed with diffraction limited spatial resolution. These measurements allow us to study single nanostructures, and provide information about their dynamics that is washed out in ensemble experiments. The systems that have been investigated to date include silver nanowires and nanoparticles, II-VI nanowires and carbon nanostructures. The time scales studied range from a few hundred fs (limited by the pulsewidth of the laser), to several hundred ps. The results provide detailed information about how these materials interact with their environment, about trapping and recombination of electrons and holes in semiconductor nanowires, and energy transport and dissipation in metal nanostructures. Transient absorption images can also be collected by raster scanning the sample over the laser spot. These provide information about how the nanostructures couple to light and the spatial variation of the dynamics.

Refreshments will be available prior to the seminar at 10:45 a.m. outside room 1315

Graduate Students may meet with the speaker at 1:00 p.m. in Room 8335