

## **109e Investigation of Thermal Transport in Nano-Fluids Using Forced Rayleigh Scattering**

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Liquids containing suspended nano-sized particles, or nano-fluids, have been found to have dramatically increased thermal conductivities compared to their base liquid. This enhancement of thermal conductivity, whose mechanism is not well understood, offers many new and promising applications for this class of fluids. At present, there exists a modest database of thermal conductivity measurements on nano-fluids where effects such as particle type, size and concentration have been studied. All of these data have been obtained using the transient hot-wire (THW) technique. In principle, the THW technique is relatively simple, but its implementation is complicated by the presence of boundary surfaces. In this study, we report thermal diffusivity measurements on nano-fluids obtained using an optical technique known as Forced Rayleigh Scattering (FRS). Data will be presented for an oil-based nano-fluid containing Al<sub>2</sub>O<sub>3</sub> nano-particles and an aqueous suspension of Au nano-particles. The non-invasive nature of FRS offers several advantages over the THW technique and has the potential to explore the mechanism(s) responsible for the novel thermal transport properties of nano-fluids.