

Abstract Submitted
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Thermocapillary Levitation of Nanoliter-Volume Droplets and Extension to Two-Phase Systems¹ JAMES BLACK, G. PAUL NEITZEL, Georgia Institute of Technology — The development of a novel method of droplet levitation to be employed in lab-on-a-chip (LOC) applications relies upon the mechanism of thermocapillary convection (due to the temperature dependence of surface tension) to drive a layer of lubricating gas between droplet and substrate. The fact that most droplets of interest in LOC applications are aqueous in nature, coupled with the fact that success in effecting thermocapillary transport in aqueous solutions has been limited, has led to the development of a technique for the controlled encapsulation of nanoliter-volume water droplets within a shell of inert silicone oil. Previously, microliter-volume single-phase silicone-oil droplets have been levitated. This work aims to extend this technique to nanoliter-volume single- and compound-phase oil and water droplets as well as ascertain how the fluid-fluid interface affects the internal convective currents driven by the surface flow in compound-phase systems.

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