

Abstract Submitted  
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**Experiments on Droplet Deformation and Lag in a Low Reynolds Number Flow** DAVID BIGIO, ADITYA N. SANGLI, University of Maryland, College Park, MARGARET LO, Cornell University, ARTIOM KOSTIOUK, AMIR RIAZ, University of Maryland, College Park — In low Reynolds number multiphase flows, existence of a velocity gradient in the bulk flow imposes viscous stresses on a deformable interface. Here we study the effect of a bulk flow of Castor oil, through a converging channel, on a suspended Silicone oil droplet (radius  $\sim 2$  mm). We apply Lubrication theory to study the bulk flow and approximate the single phase flow profile, which agrees well with experimental determination of the flow velocity. Suspending Silicone oil droplets into the flow, we study the effect of a constant extensional rate on the droplet imposed by the bulk flow. The degree of droplet deformation depends on the initial Capillary number and heuristic deductions of the critical Capillary number are made. Experimental observations also indicate a lag in the droplet advection velocity compared to the bulk flow at the same point and we present a physical mechanism to explain the observation.

Aditya N. Sangli  
University of Maryland, College Park

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