Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Suppression of van der Waals-driven rupture of a bubble moving in a channel NAIMA HAMMOUD, Princeton University, PHILIPPE H. TRINH, University of Oxford, HOWARD A. STONE, Princeton University — Recent experimental work by Chen et al. (Appl. Phys. Lett. 103, 2013) revealed that when an oil drop is passed through a water-filled channel with hydrophobic walls, rupturing may occur with the droplet adhering to the channel walls if the flow is sufficiently slow. However, if the speed of the flow is increased beyond some critical value, rupturing is suppressed. A scaling argument can be developed to predict this critical transition, but also of interest are the dynamics that govern the transition between stability and instability. In this talk, we shall present further results on this phenomenon through a thin-film model of bubble motion that incorporates the effects of viscosity, surface tension, and van der Waals forces.

Naima Hammoud
Princeton University

Date submitted: 01 Aug 2014 Electronic form version 1.4