

Abstract Submitted  
for the DFD15 Meeting of  
The American Physical Society

**Experimental free-surface instability growth in gravity-driven film flows of Newtonian and non-Newtonian liquids** JEFFREY OLANDER, ROBERTO CAMASSA, M. GREGORY FOREST, University of North Carolina at Chapel Hill, H. REED OGROSKY, University of Wisconsin-Madison — We present experiments on the growth of free-surface instabilities for Newtonian and viscoelastic film flow in a tube. The liquids used were a Newtonian silicone oil and various concentrations of elastic Boger fluids. The test liquids were injected axisymmetrically into a vertical glass tube at constant volume flow rate and the evolution of the free surface was observed as the film flowed down the tube due to gravity. The range of film thicknesses which exhibited instability growth was smaller for Boger fluids than for silicone oil. Long-wave modeling studies of related problems will be compared with the experimental observations, and our test fluids' rheology and potential mechanisms for the observed instability growth will be discussed.

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Date submitted: 01 Aug 2015

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