Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

**Optimal Capillarity Rheometry for Newtonian Fluids**[1] SUBRAMANIAM BALAKRISHNA, WILLIAM SCHULTZ, University of Michigan — The differential analysis of McCarroll et al (2016) expands upon the Capillary Breakup Rheometry (Mckinley and Tripathi (2000)) to determine the surface tension to viscosity ratio of an unsteady stretched Newtonian filament free surface. Our analysis is valid during and after stretch and hence no longer relies on breakup. Challenges associated with the choice of stretch history are twofold: 'rapid stretching' is viscous dominated and results in a nearly cylindrical free surface while 'slow stretching' results in a quasi-static profile with hard to measure viscous effects. We focus on parametric strategies that optimize rheometry.

[1]Supported by the National Science Foundation Fluid Dynamics Program

Subramaniam Balakrishna
University of Michigan

Date submitted: 10 Aug 2020 Electronic form version 1.4