Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Probing the Hydrodynamic Boundary Condition from Surface Perturbations in Thin Liquid Films OLIVER BAEUMCHEN, Max Planck Institute for Dynamics and Self-Organization (MPIDS), Goettingen, Germany , PAUL FOWLER, Department of Physics and Astronomy, McMaster University, Hamilton, Canada, THOMAS SALEZ, MICHAEL BENZAQUEN, ESPCI ParisTech, PSL Research University, Paris, France, MARK ILTON, Department of Physics and Astronomy, McMaster University, Hamilton, Canada, JOSHUA MCGRAW, Departement de Physique, Ecole Normale Superieure, PSL Research University, Paris, France, ELIE RAPHAEL, ESPCI ParisTech, PSL Research University, Paris, France, KARI DALNOKI-VERESS, Department of Physics and Astronomy, McMaster University, Hamilton, Canada — For flows on the micro- and nanoscale, the hydrodynamic boundary condition of a liquid at a solid surface plays an enormous role. In recent years much has been learned about this slip boundary condition from flows that are driven by capillary forces, e.g. dewetting thin liquid films featuring a three-phase contact line [1]. Recently, we have shown that the amplification of surface perturbations in thin liquid films allows for a quantification of slippage in the absence of a contact line [2]. We also show that the opposite approach, i.e. the capillary levelling of initially perturbed free surfaces [3], is sensitive to the slip boundary condition at the solid/liquid interface. Thin film models comprising slip enable a quantification of the slip length of viscous liquids of various molecular properties. [1] O. Bäumchen et al., Phys. Rev. Lett. 113, 014501 (2014). [2] S. Haefner et al., Nature Comm. 6, 7409 (2015). [3] J.D. McGraw et al., Phys. Rev. Lett. 109, 128303 (2012).

Oliver Baeumchen
Max Planck Institute for Dynamics and Self-Organization (MPIDS), Goettingen, Germany

Date submitted: 06 Nov 2015 Electronic form version 1.4