Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Slip effects in a dewetting polymer microdroplets T.S. CHAN, J.D. MCGRAW, S. MAURER, Experimental Physics, Saarland University, 66041 Saarbrücken, Germany, T. SALEZ, M. BENZAQUEN, É RAPHAËL, Laboratoire de Physico-Chimie Théorique, UMR CNRS Gulliver 7083, ESPCI ParisTech, PSL Research University, Paris, France, K. JACOBS, Experimental Physics, Saarland University, 66041 Saarbrücken, Germany, M. BRINKMANN, Max Planck-Institute for Dynamics and Self-Organization, Göttingen, Germany — A non-equilibrium liquid drop sitting on a smooth substrate will contract or spread depending on the equilibrium contact angle and the initial shape of the drop. Previous studies assume a huge separation of length scales between the drop contact size R and the slip length b (typically $b/R = 10^{-6}$-10^{-5}). One well known example is that of a drop spreading over a completely wetting surface, which follows Tanner's law. In this study, we experimentally and theoretically investigate contractions of microscopic droplets in regimes where these two length scales are not widely separated ($b/R = 10^{-2}$-1). These regimes become relevant in micro- and nano-fluidic systems. Instead of a quasi-static spherical shape during the evolution, the profiles display more complex shapes in these regimes. We find that: 1) the interface profile near the contact line evolves in a self-similar way in the early stage; 2) depending on b/R, the profile can develop a characteristic bump shape in the intermediate stage of the evolution. 3) at late times, the radius saturates exponentially with a certain time scale, which depends on the slip length.

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Date submitted: 01 Aug 2014 Electronic form version 1.4