Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Title: Complex Wetting: Flow profiles close to three-phase contact lines[1] BENEDIKT B. STRAUB, HENRIK SCHMIDT, FRANZISKA HENRICH, Max Planck Institute for Polymer Research, MASSIMILIANO ROSSI, Technical University of Denmark, CHRISTIAN J. KAHLER, Bundeswehr University Munich, HANS-JURGEN BUTT, Max Planck Institute for Polymer Research, GUNTER K. AUERNHAMMER, Leibniz Institute for Polymer Research — Wetting and dewetting behavior on solid surfaces is the crucial process underlying many natural phenomena as well as technical applications. We focus on the technically relevant wetting and dewetting behavior of surfactant solutions. In recent studies, focus laid on the influence of surfactants on macroscopic quantities like the contact angle. To explore the origin of the decrease of the contact angle for increasing surfactant concentration and velocity, we focus on the flow close to the contact line. Therefore, we measure three-dimensional flow profiles with an astigmatism particle tracking velocity setup. The results show that surfactants cause a deviation of the flow field in comparison to theoretical predictions for pure liquids. In the case of a receding contact line, a new air-liquid interface is formed at the three phase contact line. The surfactant concentration at the freshly formed interface is, in comparison to the already existing air-liquid interface, not in equilibrium to the bulk surfactant concentration. This causes Marangoni stresses in the direction of the contact line along the interface. This Marangoni stresses oppose the bulk flow close to the air-liquid interface and causes a deviation of the flow field.

[1]The authors thank the Deutsche Forschungsgemeinschaft (DFG) for supporting this work through the SFB1194 (project A06).

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Date submitted: 31 Jul 2019 Electronic form version 1.4