MAR14-2013-020267

Abstract for an Invited Paper
for the MAR14 Meeting of
the American Physical Society

Contact-line dynamics of colloidal interfaces

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The ongoing miniaturization in science and technology raises new questions about the behavior of liquids in confinement. One particularly suitable way to study strongly confined liquids is by combining colloid science with soft-lithography techniques. Here, we will focus on contact-line dynamics: as our model system we use a mixture of spherical colloids and non-adsorbing polymers, which allows us to directly study contact-line motion and the accompanying entrainment and pinch-off instabilities at the scale of the thermal interface fluctuations. We interpret our findings within a mesoscopic theoretical framework, where the small separation between fluid and system length scales can be matched to that of the experiments. It turns out that in this regime of length-scale overlap thermal fluctuations, wettability and gravity all play a crucial role in describing the dynamics.