ESPCI
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Séminaire PMMH

Bureau d'Études, Bâtiment L, 2 ème étage

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Depinning and arrest of liquid droplets on macroscopic and microscopic length scales

In the first part of my talk I will discuss the classic depinning problem of a macroscopic drop on a plane surface driven by a volume force. To model the drop motion we assume homogeneous contact angle hysteresis and dissipation to occur only at the contact line. Considering the free interface of the liquid to be in equilibrium with the applied volume force allows us to numerically compute the evolution of three dimensional drop shapes with high accuracy [1]. In the second part of my talk I will address the depinning and arrest of microscopic two-dimensional droplets on plane substrates with modulated surface energies. In the latter case, we assume the dynamics of the droplet to be governed by the Steady Stokes equation including a finite hydrodynamic slip [2]. In both the macroscopic and the microscopic model system we observe a range of driving forces where steady moving and pinned droplet states exist. While the dynamic bistability in the macroscopic model is essentially coupled to the quasi-static evolution of the three dimensional drop shape, the bistability observed in the microscopic model originates in the coupled dynamics of the two contact points.

[1] C. Semprebon and M. Brinkmann, Soft Matter 10 (2014) 3325
[2] D. Herde, U. Thiele, S. Herminghaus, and M. Brinkmann, EPL 100 (2012) 16002