Abstract Submitted
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Defects at the Nanoscale Impact Contact Line Motion at all Scales[1] HUGO PERRIN, Univ Paris Diderot APC, BRUNO ANDREOTTI, Univ. Paris Diderot - PMMH ESPCI - CNRS, ROMAIN LHERMEROUT, KRISTINA DAVITT, ETIENNE ROLLEY, LPS ENS - UPMC - Univ. Paris Diderot - CNRS, WETTING AND NUCLATION TEAM, PMMH TEAM — The contact angle of a liquid drop moving on a real solid surface depends on the speed and direction of motion of the three-phase contact line. Many experiments have demonstrated that pinning on surface defects, thermal activation and viscous dissipation impact contact line dynamics, but so far efforts have failed to disentangle the role of each of these dissipation channels. Here, we propose a unifying multi-scale approach that provides a single quantitative framework. We use this approach to successfully account for the dynamics measured in a classic dip-coating experiment performed over a unprecedentedly wide range of velocity. We show that the full contact line dynamics up to the liquid film entrainment threshold can be parametrized by the size, amplitude and density of nanometer-scale defects. This leads us to reinterpret the contact angle hysteresis as a dynamical cross-over rather than a depinning transition.

[1]ANR SMART and REALWET

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