

Abstract Submitted
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Different regimes of dynamic wetting¹ AMBERG GUSTAV, Linne Flow Center, The Royal Institute of Technology, JIAYU WANG, The University of Tokyo, MINH DO-QUANG, Linne Flow Center, The Royal Institute of Technology, JUNICHIRO SHIOMI, The University of Tokyo, PHYSIOCHEMICAL FLUID MECHANICS TEAM, MARUYAMA-CHIASHI LABORATORY TEAM — Dynamic wetting, as observed when a droplet contacts a dry solid surface, is important in various engineering processes, such as printing, coating, and lubrication. Our overall aim is to investigate if and how the detailed properties of the solid surface influence the dynamics of wetting. Here we discuss how surface roughness influences the initial dynamic spreading of a partially wetting droplet by studying the spreading on a solid substrate patterned with microstructures just a few micrometers in size. This is complemented by matching numerical simulations. We present a parameter map, based on the properties of the liquid and the solid surface, which identifies qualitatively different spreading regimes, where the spreading speed is limited by either the liquid viscosity, the surface properties, or the liquid inertia. The peculiarities of the different spreading regimes are studied by detailed numerical simulations, in conjunction with experiments.

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