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Droplet Dynamics on Heterogeneous Substrates DANIEL HERDE, Max Planck Institute for Dynamics and Self-Organisation, UWE THIELE, Loughborough University, STEPHAN HERMINGHAUS, MARTIN BRINKMANN, Max Planck Institute for Dynamics and Self-Organisation — Describing the dynamics of contact lines on heterogeneous substrates is important in fields ranging from coating technologies over microfluidics to enhanced oil recovery. The vast majority of studies on contact line dynamics considers the case of ideal, homogeneous substrates. Modelling chemically heterogeneous surfaces by introducing periodic variations in the wettability, we investigate the depinning and subsequent motion of 2D droplets driven by a body force. To this end, we study the time evolution of a sharp interface using Stokes dynamics together with Navier slip condition at the substrate, employing a boundary element formalism. The heterogeneity is represented by a position dependent microscopic contact angle. This allows us to quantify the modified droplet mobility, the spectrum of pinned and depinned solutions, and their dependence on periodicity and strength of the heterogeneity. Understanding the emergence of dynamic contact angles on heterogeneous substrates may open a new perspective on the relation of molecular and hydrodynamic models of contact line motion.

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