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**Contact line dynamics on chemically heterogeneous surfaces** MARTIN BRINKMANN, DANIEL HERDE, Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany, TAK S. CHAN, Saarland University, Saarbrücken, Germany, STEPHAN HERMINGHAUS, Max Planck Institute for Dynamics and Self-Organization, Göttingen — Modeling the dynamics of liquid interfaces in contact to heterogeneous solids involves a multitude of different length scales. A description of the unsteady motion of the three phase contact line on substrates with spatially varying wettability remains a challenging task, even for highly viscous liquids. To investigate this problem in the framework of continuum mechanics, we first consider the motion of an effectively two-dimensional viscous droplet on a plane substrate using a boundary element method to numerically solve the Steady Stokes equation. A dynamic bistability is observed on a smooth, sinusoidal wettability pattern if the magnitude of the slip length is comparable to the height of the droplet and, at the same time, the extension of the droplet is close to a multiple of the wavelength of the pattern. Employing a linear response formalism we study the complementary case of a liquid interface forced to move over the substrate at a fixed average velocity. The stick slip motion of the contact line amounts to an additional viscous dissipation close to the contact line and, hence, causes the macroscopic dynamic contact angle to increase further in the presence of spatially heterogeneous surface energies.

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