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Initial spreading kinetics of high-viscosity droplets on anisotropic surfaces OLESYA BLIZNYUK, STEFAN KOOIJ, BENE POELSEMA, University of Twente — Liquid droplets on chemically patterned surfaces consisting of alternating hydrophilic and hydrophobic stripes exhibit an elongated shape [1]. To assess the kinetics we present experimental results on the spreading of glycerol droplets on such surfaces using a high-speed camera. Two spreading regimes are observed, expressed in terms of the time-dependent droplet base diameter which can be described by a $r(t) \propto t^n$ power law. Initially, in what is referred to as the inertial regime, the kinetics is dominated by the liquid, and spreading is only weakly dependent on the specific surface properties. As such, liquid spreading is isotropic and the contact line maintains a circular shape. Our results reveal a remarkably long inertial regime, as compared to previous results and available models. Subsequently, in the viscous regime, interactions between the liquid and underlying pattern govern the dynamics. The droplet distorts from a spherical cap shape to adopt an elongated morphology that corresponds to the minimum energy configuration on stripe-patterned surfaces.

[1] O. Bliznyuk, E. Vereshchagina, E.S. Kooij, B. Poelsema, Phys. Rev. E 79 (2009) 041601

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