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Dynamic wetting on anisotropic patterned surfaces[1] MINH DO-QUANG, Linne Flow Center, Royal Institute of Technology, JIAYU WANG, SATOSHI NITA, JUNICHIRO SHIOMI, The University of Tokyo, GUSTAV AMBERG, Linne Flow Center, Royal Institute of Technology, PHYSIOCHEMICAL FLUID MECHANICS TEAM, MARUYAMA-CHIASHI LABORATORY TEAM — Dynamic wetting, as occurs when a droplet of a wetting liquid is brought in contact with a dry solid, 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. We have recently quantified the hindering effect of fairly isotropic micron-sized patterns on the substrate. Here we will study highly anisotropic surfaces, such as parallel grooves, either perpendicular or parallel to an advancing contact line. This is done by detailed phase field simulations and experiments on structured silicon surfaces. The dynamic wetting behavior of drops on the grooved surfaces is governed by the combined interplay of the wetting line friction and the internal viscous dissipation. Influence of roughness is quantified in terms of the energy dissipation rate at the contact line using the experiment-simulation combined analysis. The energy dissipation of the contact line at the different part of the groove will be discussed. The performance of the model is assessed by comparing its predictions with the experimental data.

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