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Wall energy relaxation in Cahn-Hilliard model for moving contact lines PENGTAO YUE, Virginia Polytechnic Institute and State University, JAMES FENG, University of British Columbia — Contact angle in the Cahn-Hilliard model is determined by wall energy. The finite-rate relaxation of this wall energy results in a dynamic contact angle which differs from the static one. According to our numerical simulation, the wall energy relaxation is crucial to the successful fitting of experimental data with a numerically manageable slip length, which could be two orders of magnitude larger than the physical one. Through a simple analysis, we establish a relationship between the dynamic contact angle and the capillary number, which is verified by our numerical simulation. We further show that this relationship is consistent with Cox's hydrodynamic model. In a sense, the wall energy relaxation coarse-grains an area surrounding the contact line into a "slip region" while keeping the apparent contact angle outside the region unchanged. In the end, we show some new results on drop spreading.

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