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Moving contact lines on vibrating surfaces[1] ZLATKO SOLOMENKO, Ecole centrale de Lyon, PETER SPELT, University Claude Bernard Lyon 1, JULIAN SCOTT, Ecole centrale de Lyon — Large-scale simulations of flows with moving contact lines for realistic conditions generally requires a subgrid scale model (analyses based on matched asymptotics) to account for the unresolved part of the flow, given the large range of length scales involved near contact lines (Sui et al., Annu. Rev. Fluid Mech. 2014). Existing models for the interface shape in the contact-line region are primarily for steady flows on homogeneous substrates, with encouraging results in 3D simulations (Solomenko et al., J. Comput. Phys. 2017). Introduction of complexities would require further investigation of the contact-line region, however. Here we study flows with moving contact lines on planar substrates subject to vibrations, with applications in controlling wetting/dewetting. The challenge here is to determine the change in interface shape near contact lines due to vibrations. To develop further insight, 2D direct numerical simulations (wherein the flow is resolved down to an imposed slip length) have been performed to enable comparison with asymptotic theory, which is also developed further. Perspectives will also be presented on the final objective of the work, which is to develop a subgrid scale model that can be utilized in large-scale simulations.

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