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Slip in viscous contact-line movement HENRIK VAN LENGERICH[1], Brown University, PAUL STEEN, Cornell University, KENNETH BREUER, Brown University — The typical continuum fluid dynamics formulation cannot be used to model the spreading of a liquid on a solid because a stress singularity prevents contact-line motion. It is well known that this situation can be remedied by introducing a slip. We perform Stokes-flow simulations with slip and compare these with experiments. In the experiment, liquid (squalane) is forced through two parallel sapphire plates (roughness 0.6nm), and the meniscus shape and its speed are measured. The slip-length for this liquid/solid pair has been measured previously in an independent experiment absent of contact lines (T. Schmatko et. al. PRL 94, 244501). The same geometry is used in a boundary integral method simulation, accurate to within a few molecular diameters in the vicinity of the contact-line. The slip-length in the simulations can be varied such that the meniscus shape matches the experiment. Preliminary results suggest this slip-length is an order of magnitude lower than that reported by Schmatko.

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