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**Sources of vorticity at interface curvature singularities and the triple contact point** PETER ZHANG, KAMRAN MOHSENI, University of Florida — In our recent two-phase experiments [DeVoria & Mohseni, Phys. Fluids, 27(1), 2015], high concentrations of positive and negative vorticity have been observed near the moving contact line. These distributions suggest that the moving contact line, characterized by singular interface curvature, may be a unique source of vorticity. Motivated by this possibility, we conduct an analytic investigation of vorticity generation near sharp corners. To model the problem, we assume that the fluid is governed by the Stokes flow equations whose solutions can be found analytically. The general solution is composed of an exterior and interior multipole expansion, indicating sources of vorticity at or far from the corner respectively. A vorticity monopole, characterized by constant vorticity generation from the corner singularity, is observed for corner flows with logarithmic interface normal velocity only. A vorticity dipole and quadrupole are identified as the vorticity distribution for a moving contact line and interface cusp respectively. Using the analytic solution, exact relations for the vorticity multipole strengths and orientations are derived. A comparison of the analytic model with experimental measurements and numerical simulations show agreement in the vicinity of the corner.

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