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Simulations of electrowetting dynamics in free and and confined droplet geometries KARL GLASNER, University of Arizona, Dept. of Mathematics, HSIANG-WEI LU (UCLA) COLLABORATION, ANDREA BERTOZZI (UCLA) COLLABORATION, C.J. KIM (UCLA) COLLABORATION — Electrowetting has become popular for moving small amounts of fluids in confined spaces (e.g. [J. Lee et al. Sensors and Actuators, A95 259 (2002)]). Models are proposed in two cases: a quasi-steady thin film approximation for a free droplet on a surface, and a Hele-Shaw type model for the two-plate geometry. In the first case, a boundary integral method is formulated which leads to a very efficient numerical algorithm. In the second case, diffuse-interface methods are utilized. The phenomenon of contact angle hysteresis and its dynamical implications are addressed. In the case of the Hele-Shaw geometry, we compare our results to experimentally observed droplet motion.

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