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Numeric Simulation of EWOD and DEP Force Distributions
PATRICK YOUNG, ERIC BAIRD, KAMRAN MOHSENI, University of Colorado at Boulder — Two primary methods for electrostatically actuating microdroplets in channels currently exist: Dielectrophoresis (DEP) for electrically insulating liquids, and electrowetting on dielectric (EWOD) for conducting fluids. In each case, a transverse electric field is used to create an electrostatic pressure for transporting individual liquid slugs. This paper examines the nature of the force distribution for both EWOD- and DEP-actuated droplets. The effects of system parameters such as dielectric constant, dielectric thickness, contact angle and channel height on the shape of the force density and its net intergral are considered. A comparison of the scaling properties of the DEP and EWOD methods for applications in digital microfluidics is presented.

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