# The derivation of Lippmann-Young equation considering the interface deformation in the electrowetting

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The Lippmann-Young equation is derived by considering the deformation of interface near the three-phase contact line. The equation governing the deformation of interface, which describes the local balance of the Maxwell stress and the capillary pressure, is integrated along the interface. The integration leads to the Lippmann-Young equation. Young's angle is assumed to be not affected by the Maxwell stress. The meaning and validity of the assumption are discussed. The validity of the Lippmann-Young equation under the deformation is tested through the electric field calculation based on the Poisson-Boltzmann equation and the shape prediction through the local normal stress balance equation. The shape deformation and electric field calculation are performed iteratively. The wetting tension, which is the integration of the Maxwell stress along the droplet surface, is calculated and compared with the analytic solution. Furthermore, the effect of thickness of the dielectric layer on the distribution of the Maxwell stress along the drop surface is studied numerically.