DROPLET ELECTROWETTING IN A WEDGE GEOMETRY

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The motion of a fluid front subject to electric stresses is a fundamental aspect of the process of electrowetting. Here, we use an experimental setup consisting of a pair conducting plates that form a wedge[1] to study the response of the leading and trailing fronts of a droplet upon electrowetting actuation. We observe two distinct dynamic regimes corresponding to high and low droplet mobilities, which we model using a recently-developed lattice-Boltzmann method[2]. Our results provide evidence that the motion of a liquid front during electrowetting exhbits dynamic transitions between two limiting regimes : a stable forced wetting regime, where the droplet has a true contact line that advances on the solid, and an entrainment regime, where a thin film of the ambient fluid prevents direct contact.

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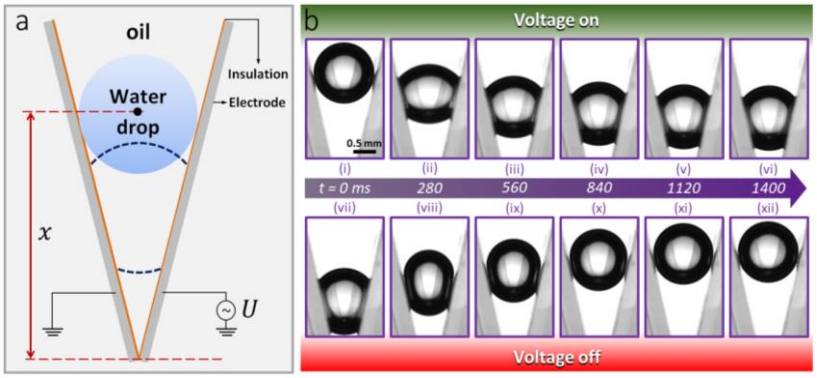

Fig. 1: Electrowetting and dewetting of a droplet in a wedge geometry

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