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Diffuse-interface simulations of inertial effects in droplet spreading and in 3D shear-driven droplet motion on a wall HANG DING, PETER SPELT, Imperial College London — A diffuse interface method is developed to simulate 3D two-phase flows with moving contact lines. The method is first used to study axisymmetric spreading of a droplet on a solid surface. The results are shown to agree well with those obtained from a level-set method, and also to agree well with lubrication theory at low capillary numbers. At sufficiently large Reynolds numbers (Re>20), in an inertial spreading regime, a capillary wave is observed to travel away from the contact line, in qualitative agreement with experiments. In the second part of this presentation, the method is made to account for effects of contact-line hysteresis, and is used to study of 3D shear flow past a droplet on an adhering channel wall. Results are presented for cases at different capillary and Reynolds numbers. These include results in which part of a moving droplet is sheared off.

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