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Micro-droplets lubrication film thickness dynamics AXEL HUERRE, MMN, UMR CNRS 7083, ESPCI ParisTech, 75005 Paris, France, OLIVIER THEODOLY, LAI, INSERM U600, CNRS UMR 6212, Case 937, 13009 Marseille, France, ISABELLE CANTAT, IPR, UMR CNRS 6251, Universite de Rennes 1, 35000 Rennes, France, ALEXANDER LESHANSKY, Department of Chemical Engineering, Technion-IIT, Haifa, 32000, Israel, MARIE-PIERRE VALIGNAT, LAI, INSERM U600, CNRS UMR 6212, Case 937, 13009 Marseille, France, MARIE-CAROLINE JULLIEN, MMN, UMR CNRS 7083, ESPCI ParisTech, 75005 Paris, France, MMN TEAM, LAI TEAM, IPR TEAM, DEPARTMENT OF CHEMICAL ENGINEERING TEAM — The motion of droplets or bubbles in confined geometries has been extensively studied; showing an intrinsic relationship between the lubrication film thickness and the droplet velocity. When capillary forces dominate, the lubrication film thickness evolves non linearly with the capillary number due to viscous dissipation between meniscus and wall. However, this film may become thin enough that intermolecular forces come into play and affect classical scalings. We report here the first experimental evidence of the disjoining pressure effect on confined droplets by measuring droplet lubrication film thicknesses in a microfluidic Hele-Shaw cell. We find and characterize two distinct dynamical regimes, dominated respectively by capillary and intermolecular forces. In the former case *rolling* boundary conditions at the interface are evidenced through film thickness dynamics, interface velocity measurement and film thickness profile.

Axel Huerre
MMN, UMR CNRS 7083, ESPCI ParisTech, 75005 Paris, France

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