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Fast liquid transfer between two surfaces HUANCHEN CHEN, TIAN TANG, University of Alberta, ALIDAD AMIRFAZLI, York University — Liquid transfer process between two surfaces typically ends by breaking of a stretched liquid bridge. The amount of liquid remaining on each of the surfaces relative to total volume is usually of interest in applications (e.g. offset or electronic printing, wet adhesion systems, etc.). Literature shows that depending on stretching velocity, U, surface wettability and liquid properties, the behaviour of the liquid bridge can be categorized into: quasi-static where the surface force dominates and dynamic where contributions from viscous and inertia forces are not negligible. Through a systematic experimental study, we demonstrate for the first time that the division of liquid between surfaces in the quasi-static regime is a constant which depends on the receding contact angles. In the dynamic regime (fast transfer), liquid division takes a complicated form. An analytical-empirical model is developed and verified by experimental results that can predict splitting of the liquid between two surfaces as a function of U, surface wettability and liquid viscosity. The model also successfully predicts an even split between surfaces at extremely high velocities as it was observed by us and others.

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