Abstract Submitted
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Pancake droplets on the grill: Thermocapillary motion of confined droplets in Hele-Shaw cells[1] MARC HABISREUTINGER, FRANÇOIS GALLAIRE, PIERRE-THOMAS BRUN, MATHIAS NAGEL, EPFL - STI - IGM - LFMI — Assuming constant surface tension, the sphere is an equilibrium shape for a drop that is translating at low Reynolds number through an infinite domain of stationary fluid. Remarkably, this result still holds true for the thermocapillary motion of a drop in a fluid at rest, when a constant temperature gradient is imposed and convection effects are neglected (Young, Goldstein and Block [1]). On the contrary, we show analytically that such an ideal result no longer stands when constraining the surrounding geometry of the droplet. For instance, flattened cylindrical droplets in microchannels, so-called pancake droplets, do not represent an equilibrium shape of thermocapillary motion. Our numerical studies also enable to take into account the flow-induced temperature variations and could help building a scaffold towards the individual control of droplets in microchannels.

[1] N.O. Young, J.S. Goldstein and M.J. Block, The motion of bubbles in a vertical temperature gradient, J. Fluid Mech. 6, 350-6 (1959).

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