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Stationary microdroplets in a Hele-Shaw Cell: anchoring mechanism and flow field SUNGYON LEE, Mathematics, UCLA, RÉMI DANGLA, LadHyX and department of Mechanics, Ecole Polytechnique, FRANÇOIS GALLAIRE, Mechanical Engineering, EPFL, CHARLES BAROUD, LadHyX and department of Mechanics, Ecole Polytechnique — When a droplet is confined inside a Hele-Shaw cell, it adopts a “pancake”-like shape from its relaxed spherical state, resulting in increase in its surface energy. Variations in the level of confinement lead to the gradient in surface energy, or a force, to “anchor” droplets against the mean external flow. In this talk, we discuss the experimental and theoretical findings of this novel anchoring mechanism. In addition, a peculiar three-dimensional flow pattern has been observed on the boundary of the anchored drop. We show the robustness of this flow pattern over various flow conditions and provide the theoretical justification based on the Marangoni stresses on the droplet interface.

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