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**Anchors and rails: trapping and guiding drops in 2D** RÉMI DANGLA, SUNGYON LEE, CHARLES BAROUD, LadHyX and department of Mechanics, Ecole Polytechnique, CNRS 91128 Palaiseau Cedex, France — We present a method to control the motion of drops in a wide and thin microchannel, by etching fine patterns into the channel's top surface. Such control is possible for drops that are squeezed by the channel roof, by allowing them to reduce their surface energy as they enter into a local depression. The resulting reduction in surface energy pulls a drop into the groove such that localized holes can be used as anchors for holding drops, while linear patterns can be used as rails to guide them along complex trajectories. An anchored drop can remain stationary indefinitely, as long as the velocity of the surrounding oil remains below a critical value which depends on the drop size and channel geometry. A rail pointing laterally guides drops whose size is below a critical radius which depends on physical and geometric parameters. This can be used to separate drops based on size or on their physical properties.

Rémi Dangla
LadHyX and department of Mechanics,
Ecole Polytechnique, CNRS 91128 Palaiseau Cedex, France

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