Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Deformation of quasi-two-dimensional drops traveling in a microchannel.[1] PABLO MARDONES MUÑOZ, MARíA LUISA CORDERO GARAYAR, Universidad de Chile — When water and oil are injected into a shallow channel, water droplets form in a quasi-two-dimensional geometry. In an equilibrium situation the water-oil interface of the drops adopts a circumferential shape of radius R to minimize the energy. However, when a pressure gradient puts the system out of equilibrium, the shape of the droplets is modified to respond to the strains on their edge.
To characterize the deformation of the drops, we have measured the interface shape and decomposed it into Fourier modes. We focus on the evolution of the drop deformation, since their formation until they reach their equilibrium shape. By varying the experimental conditions, we study drop shape and its evolution as a function of the capillary, Ca, number and the confinement of the drops in the shallow channel, d. We have found a scale law in which the steady-state root mean square deformation of the drops is proportional to the confinement d to the fourth power.

[1]PhD. student finance by CONICYT National PhD-fellowship: Beca Nacional (2018) No. 21181182 and Fondecyt proyect No. 1170411

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Date submitted: 05 Sep 2019 Electronic form version 1.4