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**Dripping and jetting regimes in co-flowing capillary jets: unforced measurements and response to driving** CHARLES BAROUD, MARIA-LUISA CORDERO[1], LadHyX, Ecole Polytechnique, France, FRANCOIS GALLAIRE, EPFL, Switzerland — We study the breakup of drops in a co-flowing jet, within the confinement of a microfluidic channel. The breakup can occur right after the nozzle (dripping) or through the generation of a liquid jet that breaks up a long distance from the nozzle (jetting). Traditionally, these two regimes have been considered to reflect an absolutely unstable jet or a convectively unstable jet, respectively. We first provide measurements of the frequency of oscillation and breakup of the liquid jet; the dispersion relation thus obtained compares well with existing theories for convective instabilities in the case of the jetting regime. However, the theories in the absolutely unstable mode fail to predict the evolution of the frequency and drop size in the dripping regime. We also test the jet response to an external forcing, using a focused laser to locally heat the jet. The dripping regime is found to be insensitive to the perturbation and the frequency of drop formation remains unaltered. In contrast, the jetting regime locks to the external frequency, which translates into a modification of the drop size in agreement with the dispersion relations. This confirms the convective nature of the jetting regime.

[1]Permanent address: Universidad de Chile

Charles Baroud
LadHyX, Ecole Polytechnique, France

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