

Abstract Submitted
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Tip streaming from microfluidic drops flowing in a sheared flow CHARLES BAROUD, SIMON MOLESIN, LadHyX, Ecole Polytechnique, THOMAS DUBOS, LMD, Ecole Polytechnique, PAUL MANNEVILLE, LadHyX, Ecole Polytechnique — Water drops in paraffin oil are formed in a microfluidic channel, in the presence of a weak concentration of surfactant. The fluid is transported in a microchannel with a constant radius of curvature, thus producing a viscous shear stress on the drops. The drop velocity begins slower than the mean velocity of the oil and initially increases slowly. As a critical value of the velocity is reached, a transition is observed during which the drop velocity rapidly increases by a factor of three. The drops also re-align themselves parallel to the channel and one or a few well defined tails are produced behind the drop. A capillary number can be written which takes into account the time evolution of the drop. The critical value of this capillary number is found to be a constant at the moment of the transition, regardless of drop size, flowrate, or surfactant concentration. We will discuss the transition between the two states, as well as the critical tip-streaming and the small drops that are thus produced.

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