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Streamlines and mixing patterns for drops in capillaries FRANCOIS BLANCHETTE, University of California Merced — We present a theoretical and numerical investigation of streamlines and mixing patterns within drops flowing in capillaries. We study theoretically the limit case of purely viscous flow around a small drop, and find that recirculating regions are always present at the front and back of such drops. Using two-dimensional simulations, we visualize streamlines for larger drops, showing that the extent of these recirculating torii increases with drop size and decreases with Reynolds number. We study the mixing within drops as they are subjected to time-dependent shear, thus modeling a sinusoidal channel, and find that while cross-stream mixing is efficient, streamwise mixing is hindered by the front and back recirculating regions.

Francois Blanchette
University of California Merced

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