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**Viscous droplet deformation and breakup in microfluidic cross-flows** THOMAS CUBAUD, Stony Brook University — The dynamic response of translating high-viscosity droplets is experimentally investigated by means of a sharp increase of the flow velocity in a microchannel junction. The additional local injection of the continuous phase from symmetric side-channels into a square microchannel produces a broad range of time-dependent deformations and breakup. In particular, due to microscale wall confinement, the system displays a non-linear behavior with the initial droplet size. Deformations, relaxation times, and fragmentation processes are examined as a function of flow and fluids properties with a particular emphasis on the formation of slender viscous structures and spoon-like droplets, i.e., asymmetrical droplets.

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