

Abstract Submitted
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Stretching of flexible molecules inside fluid threads PAULO E. AR-RATIA, GABRIEL JUAREZ, University of Pennsylvania — The evolution of viscoelastic fluid threads undergoing capillary breakup is complex and depends on the delicate balance between capillary, viscous, and elastic stresses which result in behavior that is markedly different from Newtonian fluids such as the “beads-on-a-string” phenomenon. Here, we aim to understand the thinning of a fluid thread and the drop breakup process of polymeric fluids in a simple microfluidic device by direct visualization of fluorescent DNA molecules. Molecules are observed to transition from a coiled state to an almost fully stretched state when experiencing extensional flow within the filament. The stretching of flexible molecules under applied viscous stress is characterized by a simple worm-chain model.

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