

Abstract Submitted
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Stirring viscous fluid with a “taffy puller”¹ MOHSEN GHEIS-ARIEHA, KELLEN SHAIN, ALEC CALHOUN², MARK STREMLER, Virginia Tech — Taffy pulling devices are designed to repeatedly stretch and fold a viscoplastic substance, generally using three or four rotating prongs or rods. We apply this approach to mixing viscous fluid. The periodic rod motion can be analyzed using the Thurston-Nielsen classification theorem, which gives a quantitative lower bound on the exponential stretching rate in the fluid surrounding the rods. We compare the predictions of this theorem to the results of a semi-analytical Stokes flow model that is validated with experiments. We also show that fluid mixing can be increased substantially by increasing the number of stirring rods.

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