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Experiments on Rearrangements and Forces in 2D Emulsion Hopper Flow XIA HONG, KENNETH DESMOND, DANDAN CHEN, ERIC WEEKS, Physics Department, Emory University — We conduct experiments with a quasi-two-dimensional binary emulsion flowing through a hopper. Our samples are oil-in-water emulsions confined between two close-spaced parallel plates, so that the droplets are deformed into pancake shapes. In this system, there is only viscous friction and no static friction between droplets. The hopper flow induces a high rate of rearrangement events allowing us to understand how stresses and forces change during the process. By imaging the droplets during flow, we observed T1 events, which are topological changes when droplets exchange neighbors. Simultaneously, we measure forces between the droplets using a technique we have developed. We study the evolution of forces between droplets during rearrangements, finding that rearrangements decrease the inter-droplet forces of nearby droplets.

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