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Observing rearrangements in a 2D emulsion flowing through a hopper DANDAN CHEN, KEN DESMOND, ERIC R. WEEKS, Physics Dept., Emory University — Jamming in granular flow through a hopper has been well studied, and structures such as arches have been found in simulations both with and without friction, and in experiments with friction. To study if jamming can happen in other frictionless systems, we pump dense emulsions (oil in water) through a glass hopper. The oil droplets experience a viscous friction but do not have static friction acting between touching droplets, in contrast to granular particles. For easy imaging, we squeeze the droplets into quasi two-dimensional disks by injecting the emulsion into a thin chamber made from two parallel glass plates. Movies of the flow are taken from the top by a microscope. Due to the narrowing confinement in the hopper, droplets are forced to rearrange, and we observe topological changes such as T1 events. At the same time, the interdroplet forces are measured from the deformation of the droplets. By varying the hopper gap width and angle, we study how the constriction affects the particles' motions, and how this relates to the interdroplet forces.

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