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Stabilization of toroidal droplets using viscoelastic media

EKAPOP PAIRAM, ALBERTO FERNANDEZ- NIEVES, School of Physics / Georgia Tech Team — We inject a viscous liquid through a needle into another rotating viscous liquid to generate toroidal droplets. These droplets are unstable and undergo a transformation into spherical droplets driven by surface tension: They either break ala Rayleigh-Plateau or grow fatter to become a single spherical droplet depending on the aspect ratio of the torus. By replacing the outer phase with a viscoelastic fluid with a non-zero yield stress we can stabilize these and other non-zero genus droplets. We will examine this stabilization mechanism and present criteria to effectively prevent the break-up of these droplets.

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