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Charge-Induced Viscous Fingers in Toroidal Droplets ALEXANDROS FRAGKOPOULOS, AARON AIZENMAN, ALBERTO FERNANDEZ-NIEVES, Georgia Institute of Technology — Toroidal droplets transform into spherical droplets to minimize their surface area. They do so either by breaking via the Rayleigh-Plateau instability or by shrinking; in this case, the handle collapses onto itself resulting in the formation of a single spherical droplet. Shrinking is always present for an uncharged toroidal droplet due to the variation of the Laplace pressure around circular cross-section of the torus. The presence of charge can qualitatively change this behavior and result the expansion of the torus; this happens as a result of the electric stress on the surface, which competes with the surface tension stress. Here, we will show that this expansion can result in the formation of fingers that are reminiscent of those formed via Saffman-Taylor instabilities.

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