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Dynamics of active droplets of nematic fluid immersed in a viscous fluid[1] YUAN-NAN YOUNG, New Jersey Inst of Tech, DAVID STEIN, Flatiron Institute, MICHAEL SHELLEY, New York University/Flatiron Institute — Coarse-grained continuum descriptions of active suspensions (fluids with extra stresses from the activity of suspended particles) have successfully predicted instabilities, pattern formation and complex dynamics observed in some experimental systems. In this work we examine the dynamics of droplets filled with suspended immotile particles that exert active dipolar stresses on the fluid. We show that the effects of surface tension on the linear instability of the active fluid depends on whether the suspended active particles are extensile or contractile. Based on the linear stability of the active droplet, we are able to find parameters that correspond to various nonlinear droplet dynamics such as a washing machine mode, a steady squirmer, a pulsating squirmer, and a meanderer. Simulations of a small system of such active drops give insight into how the activity inside the drops dictates how they communicate with each other in different parameter regimes.

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