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**Linear instability and nonlinear dynamics of a drop and thin film of active fluid**[1] YUAN-NAN YOUNG, New Jersey Institute of Technology, DAVID STEIN, Flatiron Institute, MICHAEL SHELLEY, New York University and Flatiron Institute — Active suspensions are fluids with extra stresses from the energy-consuming activity of suspended particles. Coarse-grained continuum descriptions have successfully predicted instabilities and pattern formation observed in some experimental systems. In this work we focus on the effects of surface tension on the stability and nonlinear dynamics in droplets and layers of active fluid. Specifically we study the stability of a moving boundary between a viscous fluid and droplet- or layer-bound active suspension. Linear stability analyses predict parameter regimes for various dynamics such as rotation, self-propulsion, and chaotic dynamics. Weakly nonlinear analyses predict the equilibrium drop deformation as a function of activity magnitude in the suspension. 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.

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