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Diffuse interface approach to rotating Hele-Shaw flows JOSE MIRANDA, Dept. Fisica, UFPE - Brazil, CHING-YAO CHEN, YU-SHENG HUANG, Dept. Mech. Engineering, National Chiao Tung University, Taiwan — When two fluids of different densities move in a rotating Hele-Shaw cell, the interface between them becomes centrifugally unstable and deforms. Depending on the viscosity contrast of the system distinct types of complex patterns arise at the fluid-fluid boundary. Deformations can also induce the emergence of interfacial singularities and topological changes such as droplet pinch-off and self-intersection. We present numerical simulations based on a diffuse interface model for this particular two-phase displacement that capture a variety of pattern forming behaviors. This is implemented by employing a Boussinesq Hele-Shaw-Cahn-Hilliard approach, considering the whole range of possible values for the viscosity contrast, and by including inertial effects due to the Coriolis force. The role played by these two physical contributions on the development of interface singularities is illustrated and discussed.

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