Abstract Submitted
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Phase-Field Modeling of the Buoyancy-Driven Detachment of a Wall-Bound Pendant Drop[1] ANDREA LAMORGESE, ROBERTO MAURI, DICI/University of Pisa, LABORATORY OF MULTIPHASE REACTIVE FLOW TEAM — We investigate numerically the critical conditions for detachment of an isolated, wall-bound emulsion droplet acted upon by surface tension and wall-normal buoyancy forces alone using a simple extension of a diffuse interface model for partially miscible binary mixtures that was previously employed for simulating several two-phase flow phenomena far and near the critical point ["Phase-Field Approach to Multiphase Flow Modeling," Milan J. Math. **79**, 597 (2011)] to allow for static contact angles other than 90°. We use the same formulation of the Cahn boundary condition as first proposed by Jacqmin ["Contact-line dynamics of a diffuse fluid interface," J. Fluid Mech. **402**, 57 (2000)], which accommodates a cubic (Hermite) interpolation of surface tensions between the wall and each phase at equilibrium. We show that this model can be successfully employed for simulating three-phase contact line problems in stable emulsions with nearly immiscible components. We also show the first numerical determination of critical Bond numbers as a function of static contact angle by phase-field simulation.

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