

Abstract Submitted
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Nucleated growth patterns in binary phase-separating liquid gas systems CHRISTOPHER POOLEY, ANNA BALAZS, University of Pittsburgh, JULIA YEOMANS, University of Oxford — We construct a model to simulate systems that have gas in coexistence with a binary liquid. We present a statistical mechanical approach similar to that used to derive the Van der Waals equation of state. However, in this case, we introduce two species of particle with different interactions between similar and dissimilar types, and from this we derive the Landau free energy density. In equilibrium, the system minimizes this free energy, and this allows us to construct the phase diagram. Using a binary lattice Boltzmann algorithm, we numerically model this system. In particular, we focus on the discovery of intriguing tentacle structures observed in a small area within the nucleation region. We show how these structures grow in time, and how this evolution is changed in the inertial, viscous and diffusive limits.

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