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Phase Separation in the Advective Cahn-Hilliard Equation with a Chaotic Flow SOHEI YASUDA, BENJAMIN VOLLMAYR-LEE, Bucknell University — The phase separation between two immiscible liquids advected by a chaotic flow is studied by numerical simulations of the advective Cahn-Hilliard Equation. It has been shown that the competition between phase separation dynamics, which tends to grow domains, and chaotic flow, which tends to break up the domains, determines the length scale characterizing the domains in the steady state [1]. We extend this analysis to investigate the correlation between the local finite-time Lyapunov exponent field and the domain structure. In particular, we consider alternating sine flows and an alternating periodic vortex flow. We also investigate whether the steady state domain structure demonstrates any history dependence by studying both a initially mixed state and an initially phase separated state. A summary of our results is presented.

[1]L. O. Naraigh, J.-L. Thiffeault, Phys. Rev. E **75**, 016216 (2007).

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