Supplemental Material for: Zero-Temperature Coarsening in the 2d Potts Model

J Olejarz[1], P L Krapivsky[2], and S Redner[1]

[1]Center for Polymer Studies and Department of Physics, Boston University, Boston, MA 02215, USA

[2]Department of Physics, Boston University, Boston, MA 02215, USA

We provide four movies to accompany our manuscript `Zero-Temperature Coarsening in the 2d Potts Model`.

This movie corresponds to Fig. 4 in the paper and shows the evolution of the 3-state Potts model on a 192×192 square, with initial densities of the red, green, and blue spin states of $\frac{10}{32}$, $\frac{11}{32}$, and $\frac{11}{32}$. The minority red phase eventually disappears and the ensuing dynamics is Ising like. This system coarsens into a diagonal stripe state.

This movie corresponds to Fig. 12 and shows the evolution of the 3-state Potts model on a 33×33 square into a long-lived pseudo-blinker state. Between times $t = 251$ and $t = 16,160,677$, the red/blue and blue/green interfaces wander stochastically in such a way that the energy E remains constant, with $E = 188$. Here the energy is defined as the total length of all interfaces. At $t = 16,160,677$—four orders of magnitude longer than the coarsening time—the pseudo-blinker interfaces touch, the energy drops to $E = 185$, and the system quickly gets trapped in its final state.

This movie corresponds to Fig. 14 and shows a large avalanche in the 6-state Potts model on a 192×192 square. By time $t \approx 40000$ the system has reached a state that is geometrically similar to that in 14(a), except for small interface fluctuations. At $t = 633000$, two yellow clusters in the upper middle of the square coalesce. The merged cluster grows by repeated filling of its convex hull and mergings with nearby clusters. By $t = 640000$, this avalanche has engulfed a significant fraction of the system.

This movie corresponds to the top line of Fig. 18 and shows the evolution of the 6-state Potts model on a 192×192 square. At $t = 100$, the green clusters in the upper-right corner touch, which triggers an avalanche that drives the system to the ground state.