

Multistable Spatiotemporal Dynamics in the Driven Frenkel-Kontorova Lattice

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Abstract: Spatiotemporal dynamics of the damped dc-driven Frenkel-Kontorova lattice is studied. Multistable topologies are shown. Intermittency of the dynamical contraction factor is found, and this behavior is a consequence of the collisions of kinks and antikinks. Fast kinks and antikinks are unstable. The transition from the localized kink to the whirling mode is found to be a temporal bifurcation cascade of generations of kink-antikink pairs and the collision-induced avalanche dynamics. Noise-induced topology transition is observed and discussed.

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Key words: Frenkel-Kontorova model, kink-antikink pair, dynamical contraction factor

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