Dynamic effects induced by renormalization in anisotropic pattern forming systems

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As an example we consider the anisotropic Kuramoto-Sivashinsky equation, which is a generic model of anisotropic pattern forming systems and has been derived in different instances of thin film dynamics. A rotation of a ripple pattern by 90° occurs in the system evolution when nonlinearities are strongly suppressed along one direction. This effect originates in nonlinear parameter renormalization at different rates in the two system dimensions, showing a dynamic interplay between scale invariance and wavelength selection. Potential experimental realizations of this phenomenon are identified. A. Keller, M. Nicoli, S. Facsko, and R. Cuerno, Phys. Rev. E 84, 015202(R) (2011).