Phase Compactons in Oscillator Lattices

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We study the phase dynamics of a chain of autonomous, self-sustained, dispersively coupled oscillators. In the quasicontinuum limit the basic discrete model reduces to a Korteveg–de Vries-like equation, but with a *nonlinear dispersion*. The system supports *compactons* – solitary waves with a compact support – and *kovatons* – compact formations of glued together kink-antikink pairs that propagate with a unique speed, but may assume an arbitrary width. We demonstrate that lattice solitary waves, though not exactly compact, have tails which decay at a superexponential rate. They are robust and collide nearly elastically and together with wave sources are the building blocks of the dynamics that emerges from typical initial conditions. In finite lattices, after a long time, the dynamics becomes chaotic. Numerical studies of the complex Ginzburg VLandau lattice show that the non-dispersive coupling causes a damping and deceleration, or growth and acceleration, of compactons. A simple perturbation method is applied to study these effects. The talk follows our recent publications [1, 2]

[1] P. Rosenau, A. Pikovsky, Phase compactons in chains of dispersively coupled oscillators, *Phys. Rev. Lett.* **94**, 174102 (2005).

[2] A. Pikovsky, P. Rosenau, Phase compactons, *Physica D*, **218**, 56-69 (2006)