Modeling with the 2D Complex Ginzburg-Landau Equation: Pattern Competition and Domain Dynamics

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This presentation will use models based on the 2D Complex Ginzburg-Landau equation to study several generic pattern phenomena in spatially extended systems: (1) the effect of long length scale inhomogenity on spiral wave dynamics; (2) target patterns induced by very localized inhomogenity and the competition between these targets and spirals; and (3) the effect of chiral symmetry breaking on spiral wave domains. A key feature of these problems is the evolution of the spatial domains of the individual patterns.

Generic Patterns for Strong Dissipation and Forcing: Modeling Vibrated Granular Layers

We consider models in which a continuous spatial field is mapped forward in discrete time. Such models are appropriate in cases where there is homogeneous periodic forcing of a spatially extended system. When the dissipation is strong, the relevant spatial field can often be taken to be scalar. We discuss the structure of a class of such models and apply them to two situations inspired by experiments on vibrated grannular layers. One situation concerns patterns and their bifurcations, while the other concerns the evolution of the front seperating a homogeneous region from a region of spatiotemporal chaos.