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## Reactive Cellular Automata

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We introduce a new class of cellular automata (CA) to model reaction-diffusion systems. The CA uses a moving average for diffusion and a probabilistic table-lookup for the reactive processes.

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The CA universe is a regular lattice, each site of which contains a finite integer for each reacting species. The updating consists of two steps. First, a local sum of neighbors is computed for each cell. The result is used to compose an address into a lookup table, which gives the result of evolving the given state for a time interval  $\Delta t$  using the nonlinear rate equations. Rounding is performed probabilistically to achieve correct behavior on average despite the discretization [1-3]. In Figure 1 we show a snapshot obtained for the FitzHugh-



FIG. 1. Spiral wave in FHN.  
Lattice size 150\*80.

Nagumo model (FHN)  $\dot{u} = \nabla^2 u + u(a-u)(u-1) - v$ ;  $\dot{v} = \epsilon(bu - v)$ .

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