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Da-Jiang Liu* (dajiang@fi.ameslab.gov), Ames, IA 50011, and **Chi-Jen Wang** (cjiang@iastate.edu) and **J. W. Evans** (evans@ameslab.gov). *Nonequilibrium First-Order Transition in the Quadratic Contact Process or Schloegl's second Model.*

First-order transitions in nonequilibrium systems are fundamentally different from their equilibrium counterparts through the generic nature of the phase coexistence, i.e., instead of a single point in the one-parameter phase space, two-phase coexistence (2PC) occurs over a range of parameters. We choose the quadratic contact process, or the equivalent lattice implementation of Schloegl's second model for autocatalysis as the prototype. While many aspects of the transitions can be studied and understood through the use of discrete reaction-diffusion equations, stochastic effects also qualitatively change of behavior. Such stochastic effects are most fruitfully studied through Monte Carlo simulations, in particular, the constant population (coverage) algorithm is developed to study the interfaces of 2PC. Effects of dimensionality are studied in details. (Received March 04, 2013)