1058-82-162 **Jim Evans***, Ames Laboratory & Dept. of Mathematics, 315 Wilhelm Hall, Iowa State University, Ames, IA 50011, and **Da-Jiang Liu** and **Xiaofang Guo**. *Stochastic Model for Spatial Epidemics: Quadratic Contact Process.*

We analyze the quadratic contact process for a population of individuals distributed on an infinite square lattice. Individuals are either sick or healthy. Sick individuals recover spontaneously at rate p. Healthy individuals are infected by *two* or more sick neighbors. (Also, neighbors can also switch places at rate h.) We find the existence of a diseased steady-state for p (=0.0944 for h=0), with a discontinuous transition to an all-healthy (absorbing) state for p. However, a finite patch of the epidemic can only survive for p (=0.0869 for h=0). One finds "generic two-phase coexistence" for p between, i.e., stable diseased and all-healthy regions coexist [1], contrasts a Durrett-postulate [2] of equal pf andf pe. The phenomenon reflects an orientation-dependence of the "equistability value" of p for stationary planar interfaces separating all-healthy and diseased states. Analysis of both steady-state behavior and interface propagation is achieved via Kinetic Monte Carlo simulation and by approximation to the exact master equations (producing discrete RDE's).

[1] Liu, Guo, Evans, Phys Rev Lett 98 (2007) 050601; Physica A 387 (2008) 177; J Chem Phys. 130 (2009) 074106.

[2] R. Durrett, SIAM Rev. 41 (1999) 677. (Received February 13, 2010)