Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Absorbing-state transitions on percolating lattices MAN YOUNG LEE, THOMAS VOJTA, Missouri University of Science and Technology — We study the nonequilibrium phase transitions of reaction-diffusion systems into absorbing states. In the presence of quenched disorder, i.e., spatial impurities or defects, the interplay between geometric and dynamical fluctuations leads to exotic behavior and ultraslow dynamics. Specifically, we investigate the contact process on a randomly diluted lattice. We find that the nonequilibrium phase transition across the percolation threshold of the lattice is characterized by unconventional activated (exponential) dynamical scaling and strong Griffiths effects. We calculate the critical behavior in two and three space dimensions, and we relate our results to the infinite-randomness fixed point in the disordered one-dimensional contact process. To confirm the universality of this exotic scaling scenario we also study generalizations of the contact process involving several absorbing states, and we support our calculations by Monte-Carlo simulations.

Thomas Vojta
Missouri University of Science and Technology

Date submitted: 20 Nov 2008 Electronic form version 1.4