Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Characterizing Phase Transitions in a Model of Neutral Evolutionary Dynamics[1] ADAM SCOTT, DAWN KING, SONYA BAHAR, Department of Physics and Astronomy - University of Missouri at St. Louis — An evolutionary model was recently introduced for sympatric, phenotypic evolution over a variable fitness landscape with assortative mating (Dees & Bahar 2010). Organisms in the model are described by coordinates in a two-dimensional phenotype space, born at random coordinates with limited variation from their parents as determined by a mutation parameter, mutability. The model has been extended to include both neutral evolution and asexual reproduction in Scott et al (submitted). It has been demonstrated that a second order, non-equilibrium phase transition occurs for the temporal dynamics as the mutability is varied, for both the original model and for neutral conditions. This transition likely belongs to the directed percolation universality class. In contrast, the spatial dynamics of the model shows characteristics of an ordinary percolation phase transition. Here, we characterize the phase transitions exhibited by this model by determining critical exponents for the relaxation times, characteristic lengths, and cluster (species) mass distributions.

[1]Missouri Research Board; J.S. McDonnell Foundation

Adam Scott
Department of Physics and Astronomy - University of Missouri at St. Louis

Date submitted: 07 Nov 2012 Electronic form version 1.4