Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Clustering and Phase Transitions on a Neutral Landscape[1] ADAM SCOTT, DAWN KING, Center for Neurodynamics - Department of Physics & Astronomy - University of Missouri at St. Louis, NEVENA MARIC, Department of Mathematics & Computer Science - University of Missouri at St. Louis, SONYA BAHAR, Center for Neurodynamics - Department of Physics & Astronomy - University of Missouri at St. Louis — The problem of speciation and species aggregation on a neutral landscape, subject to random mutational fluctuations rather than selective drive, has been a focus of research since the seminal work of Kimura on genetic drift. These ideas have received increased attention due to the more recent development of a neutral ecological theory by Hubbell. De Aguiar et al. recently demonstrated, in a computational model, that speciation can occur under neutral conditions; this study bears some comparison with more mathematical studies of clustering on neutral landscapes in the context of branching and annihilating random walks. Here, we show that clustering can occur on a neutral landscape where the dimensions specify the simulated organisms' phenotypes. Unlike the De Aguiar et al. model, we simulate *sympatric* speciation: the organisms cluster phenotypically, but are not spatially separated. Moreover, we find that clustering occurs not only in the case of assortative mating, but also in the case of asexual fission. Clustering is not observed in a control case where organisms can mate randomly. We find that the population size and the number of clusters undergo phase-transition-like behavior as the maximum mutation size is varied.

[1]Funding provided by the University of Missouri Research Board and the James S. McDonnell Foundation.

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Date submitted: 13 Nov 2011 Electronic form version 1.4