

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

How is the fitness landscaped upon which life evolves selected?

MICHAEL DEEM, Rice University — We investigate the selective forces that promote the emergence of modularity in nature. We demonstrate the spontaneous emergence of modularity in a population of individuals that evolve in a changing environment. We show that the level of modularity correlates with the rapidity and severity of environmental change. The modularity arises as a synergistic response to the noise in the environment in the presence of horizontal gene transfer. We suggest that the hierarchical structure observed in the natural world may be a broken symmetry state, which generically results from evolution in a changing environment. The existence of such structure, therefore, need not necessarily rest on intelligent design or the anthropic principle. 1) J. Sun and M. W. Deem, Phys. Rev. Lett., to appear., arXiv:0710.3436

Michael Deem
Rice University

Date submitted: 26 Nov 2007

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