Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Is it really a small world after all BARUCH BARZEL, ALBERT-LASZLO BARABASI, Northeastern University, THE CENTER FOR COMPLEX NETWORK RESEARCH TEAM — One of the most intriguing revelations in the study of complex networks is the ubiquitous appearance of small worlds, that is networks exhibiting a small, and sometimes even ultra-small, average path length. This suggests that these networks feature globally connected dynamics, where all nodes are affected by all other nodes, given the short distance between them. Nevertheless, empirical data on the dynamics of such networks shows that in practice, such global connectedness is rarely observed. To address this gap between the topology and the observed dynamics of networks we developed the network correlation function method, a framework in which we obtain the patterns of influence between nodes in the network. In simple words we complement the topological description of *who is connected to whom*, by the dynamical description of *who is affected by whom*. Strikingly, using this method, we find that small world topology tends to avoid global dynamics, while non-small worlds could potentially support it. We test our results on a set of networks from various fields, ranging from social to biological networks, and discuss the implications on the dynamical stability of these systems.

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Date submitted: 01 Nov 2011 Electronic form version 1.4