

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Origin of Fractality in the Growth of Complex Networks** CHAOMING SONG, Levich Institute and Physics Department, City College of New York, SHLOMO HAVLIN, Minerva Center and Department of Physics, Bar-Ilan University, HERNAN MAKSE, Levich Institute and Physics Department, City College of New York — The emergence of self-similarity and modularity in complex networks raises the fundamental question of the growth process according to which these structures evolve. The possibility of a unique growth mechanism for biological networks, WWW and the Internet is of interest to the specialist and the laymen alike, as it promises to uncover the universal origins of collective behavior. Here, we present the concept of renormalization from critical phenomena as a mechanism for the growth of fractal and non-fractal modular networks. We show that the key principle that gives rise to the fractal architecture of networks is a strong effective “repulsion” between the most connected nodes (hubs) on all length scales, rendering them very dispersed.

Chaoming Song  
Levich Institute and Physics Department, City College of New York

Date submitted: 21 Nov 2005

Electronic form version 1.4