The Spring 2007 Condensed Matter Seminars series presents:

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"Voter Model on a Quenched Disordered Network"

Abstract:

Concepts of nonequilibrium statistical physics have already been employed to mimic phenomena which rely on human behavior, e.g. the emergence of collective organization in social systems. Recently, variants of the (Ising-like) voter model have been used to study quantitatively collective phenomena, such as opinion formation, or creation of consensus. However, voter-like models have mainly been studied on regular lattices justified in physical situations, but not in the context of social sciences. In socio-cultural situations, the interaction patterns between individuals find a better characterization as complex networks with connections changing in time.

We propose a new, exactly solvable model in which the voter dynamics takes place on an adaptive disordered network. The network consists of the usual agents (spins) with two possible opinions (up and down states), but in a novel dynamical approach: at each time step, the states of the agents modify the connections between them; the connections, in turn, determine the new states of the agents. In this manner, the structure of the network is quenched, as it is correlated and evolves with the dynamics of the agents. We obtain the time evolution and the final state of this sytem for arbitrary initial conditions. On short time scales the network approaches exponentially one of its completely ordered absorbing states, or some metastable states: a disordered neutral state or an active state with finite magnetization. On long time scales only the absorbing states persist.

Wednesday, January 31, 2007
4:00 P.M.
304 Robeson Hall