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**AGSOE 10: Economic Models and Evolutionary Game Theory II**

Time: Wednesday 9:30–10:15

Location: BAR 205

**Invited Talk** AGSOE 10.1 Wed 9:30 BAR 205  
**Cooperation supported by Darwinian selection of evolutionary rules** — ●GYORGY SZABO — Research Institute for Technical Physics and Materials Science, P.O. Box 49, H-1525 Budapest, Hungary

The evolutionary game theory provides a general mathematical framework for the investigation of multi-agent systems used widely in biology, economy and other social sciences. In these systems we have an extremely large freedom in the definition of models giving the set of strategies, the interaction, the connectivity structure, and dynamical rules. The introduction of co-evolutionary processes simplifies this problem by focusing our attention to those models which are them-

selves subjected to an evolutionary process.

We study co-evolutionary Prisoner's Dilemma games where each player can imitate both the strategy and imitation rule from a randomly chosen neighbor with a probability dependent on the payoff difference when the player's income is collected from games with the neighbors. The players, located on the sites of a lattice, follow unconditional cooperation or defection and use individual strategy adoption rule described by a parameter. If the system is started from a random initial state then the present co-evolutionary rule drives the system towards a state where only one evolutionary rule remains alive even in the coexistence of cooperative and defective behaviors. The final rule is related to the optimum providing the highest level of cooperation and affected by the connectivity structure.