



SFB 680

Molecular Basis of Evolutionary Innovations

Molekulare Grundlagen evolutionärer Innovationen

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Fixation times in evolutionary game dynamics - the role of selection intensity

In populations with a finite number of individuals, demographic fluctuations play an important role. The dynamics of such finite populations are analyzed in the framework of stochastic evolutionary game theory. In evolutionary biology, the probability that a mutant strategy spreads in the population and takes over is an important quantity that is well understood. Here, focus is on the mean exit time such a fixation event is expected to take (fixation time). Starting from a master equation for the distribution of fixation times of, e.g., a birth-death process, one derives and generally solves recursions for the moments. A concept that allows a deeper insight here is weak selection. This corresponds to a perturbation theory with neutral evolution as a reference, where all strategies perform equally well. Weak selection considers only small deviations from neutral evolution and is a highly relevant case in biology - most (point) mutations only provide a small change in the overall reproductive success. Various new aspects of the mean exit times in evolutionary games under weak selection can be addressed: How do the exit times depend on the parameters of the evolutionary game? How universal is the folklore of weak selection results when comparing the two most important classes of birth-death processes? How can the counter-intuitive effect be understood that a beneficial mutation can take over slower than a neutral mutation?

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11:00 a. m.

Institute for Genetics, Zülpicher Str. 47a, Seminar Room, 4th floor

Host: Joachim Krug

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