

Cologne Evolution Colloquium

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A Driven Disordered Systems Approach to Biological Evolution in Changing Environments

Parallels between biological evolution and statistical physics are well-known and have led to fruitful exchanges and concepts. One such concept is the fitness landscape which, analogous to the energy landscape of a disordered system, is an abstract representation of the environment in which a biological population evolves. Evolution in changing environments is still poorly understood. In this talk we consider a recently introduced model for antibiotic resistance evolution in bacteria. The fitness landscape changes with the antibiotic concentration, giving rise to tradeoffs between adaptation to low and high antibiotic concentrations. We show that the adaptive evolution under slowly changing antibiotic concentration can be mapped to the dynamics of a class of athermal driven disordered systems, which in turn are paradigmatic models for memory formation in matter.

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Hosted by Joachim Krug