Cologne Evolution Colloquium

Joint Seminar with

Großes Physikalisches Kolloquium

CRC 1310 Predictability in Evolution

Erwin Frey

LMU, München

Emergence and Self-Organisation in Biological Systems

xxxIsolated systems tend to evolve towards thermal equilibrium, a special state that has been a research focus in physics for more than a century. By contrast, most processes studied in biological systems are far from equilibrium. A fundamental overarching hallmark of all these processes is the *emergence of structure, order, and information*, and we are facing the major challenge to identify the underlying physical principles. Two particular exciting problems are the self-organised formation of spatio-temporal patterns and the robust self-assembly of complex structures. In both fields there are recent advances in understanding the underlying physics that will be reviewed in this talk. In *reaction–diffusion systems*, it has been shown that the essential dynamics is the spatial redistribution of the conserved quantities which leads to moving equilibria. Efficient *self-assembly* of macromolecules and protein clusters is a vital challenge for living organisms: Not only are resources limited but also are malfunctioning aggregates a substantial threat to the organism itself.

Tuesday, June 6, 2018, 16:45

Lecture Hall III

Hosted by Joachim Krug