AKB 40 Biological Networks

Zeit: Montag 14:00–14:30 Raum: TU H2013

Hauptvortrag AKB 40.1 Mo 14:00 TU H2013

Around the World in 80 Days - Forecasting the Spreading of SARS in a Network Model — •T. Geisel[1], D. Brockmann[1], and L. Hufnagel[2,1] — [1]MPI für Strömungsforschung und Fakultät Physik, Univ. Göttingen — [2]KITP, UCSB, Santa Barbara, CA, USA

The rapid worldwide spread of the severe acute respiratory syndrome (SARS) demonstrated the potential thread an infectious disease poses in a closely interconnected and interdependent world. Here we introduce a probabilistic model which describes the worldwide spreading of infectious diseases and demonstrate that a forecast of the geographical spread of epidemics is indeed possible. It combines a stochastic local infection dynamics between individuals with stochastic transport in a worldwide network which takes into account the national and international civil aviation traffic. Our simulations of the SARS outbreak are in surprisingly good agreement with published case reports. We show that the high degree of predictability is caused by the strong heterogeneity of the network. Our model can be used to predict the worldwide spreading of future infectious diseases and to identify endangered regions in advance. The performance of different control strategies is analyzed and our simulations show that a quick and focused reaction is essential to inhibit the global spreading of epidemics.