

Eugene Wigner Colloquium

joint event of GRK 1558 and SFB 910



Dr. Thilo Gross

University of Bristol, UK

“Epidemics in adaptive and heterogeneous networks”

In the 1960s and 1970s there was a brief period when it seemed that humanity would finally rid itself of epidemics. New vaccines and widespread availability of antibiotics had greatly reduced the prevalence of major epidemic diseases and smallpox was about to go extinct. However, already during this time the trend had turned: New diseases such as Legionellosis and Ebola appeared and old killers such as Malaria and Dengue came back in force. The subsequent decades saw the rise of Aids and SARS, and the emergence of major new strains of Malaria, Influenza, and others. For physics, epidemic spreading provides an interesting challenge. In its simplest incarnation, the SIS and SIR models, it presents a paradigmatic example of invasion percolation. In particular the SIS model has therefore become a major benchmark system in which new mathematical tools for the analysis of spreading processes can be tested. In this talk I will show variants of this model which incorporate adaptive responses of the underlying network across which the disease is spreading and heterogeneity in the networked agents. My main aim is to showcase both recent progress in the analysis methods for these systems as well as the rich physics of the spreading process.

P. Hövel

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