



PHYSIKALISCHES KOLLOQUIUM

Referent:

Dr. Malte Schröder

Chair for Network Dynamics, Institute for Theoretical Physics
and Center for Advancing Electronics,
TU Dresden, Germany



Thema:

Statistical Physics and Collective Dynamics of Human Mobility
(Vorstellung für Habilitation)

Zeit und Ort:

Dienstag, 8.12.2020, 16:40 Uhr
Online-Meeting: BBB / Zugang mit Browser (Firefox oder Chrome)

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Leiter:

Prof. Dr. Marc Timme

Kurzfassung:

Stephen Hawking stated that the 21st century would become the century of complexity. Physics approaches have increasingly contributed to a deeper understanding of emerging phenomena from fundamental microscopic interactions not just in quantum mechanics, particle physics or gravitational theory. Combining tools from statistical physics, nonlinear dynamics, and network science also provides insights into pattern formation processes, universal scaling, and phase transitions in complex biological or social systems. Human mobility is a prototypical example of such a complex system, characterized by simple interactions between a large number of individual participants. Here, insights into the collective dynamics have helped, for example, to explain the emergence of congestion waves in car traffic. Today, new modes of mobility promise more sustainable and accessible mobility. However, as mobility services become more interconnected and complex, new collective states emerge that may be detrimental to their function. A statistical physics approach to these systems enables us to understand the fundamental mechanisms underlying the collective dynamics and thus helps predict and design sustainable mobility systems. In this talk, I will present two current examples that highlight the potential of statistical physics and complex systems analysis in the context of mobility: the emergence of unintended collective states from dynamic pricing mechanisms and universal scaling in the dynamics of ride-sharing fleets.

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Biographie:

Malte Schröder studied Physics at the Georg August University Göttingen. He did his PhD at the International Max Planck Research School for the Physics of Biological and Complex Systems, where he studied the impact of constraints on various network dynamical systems and network formation processes. He is now a postdoctoral researcher at the Chair for Network Dynamics at the Institute for Theoretical Physics and the cfaed at TU Dresden, where he is heading the research on the dynamics and statistical physics of future networked mobility.