

**Mathematisch – Naturwissenschaftliche Fakultät**  
der Universität zu Köln  
- Der Dekan -

# Einladung

zu der am Dienstag, den 08. November 2016, um 16:45 Uhr  
im Hörsaal III der Physikalischen Institute,  
Zülpicher Straße 77

stattfindenden öffentlichen

## Antrittsvorlesung

von Herrn

**Prof. Dr. Tobias Bollenbach**

(Institut für Theoretische Physik)

über das Thema

### **Quantitative approaches to antibiotic resistance evolution**

The evolution of antibiotic resistance is an increasingly serious concern. At the same time, this phenomenon provides a rare opportunity to observe evolution in real time in the laboratory. The most challenging open questions in this field include how key aspects of drug resistance evolution can be predicted and how this worrying process can be slowed down or perhaps even entirely circumvented. In this talk, I will give an overview of basic research aimed at elucidating and controlling the evolutionary dynamics underlying drug resistance. Physicists have recently played a central role in tackling this problem by developing new quantitative experimental techniques and theoretical concepts. In this context, I will present recent results from my group that revealed quantitative determinants enabling partial predictions of resistance evolution. I will further discuss how drug interactions that occur when multiple antibiotics are combined can be exploited to counteract resistance. We have shown that such drug interactions obey simple scaling laws that facilitate the design of optimized multidrug combinations. I will also discuss open challenges and how we will tackle them.

A. Büschges  
Dekan