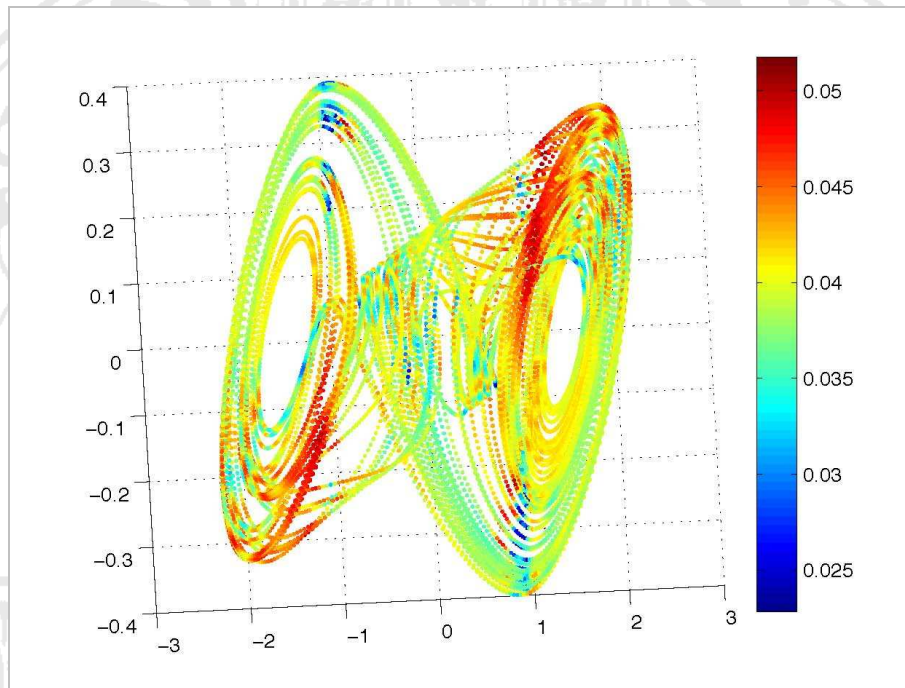


PHYSIKALISCHES KOLLOQUIUM

AM 31. OKTOBER 2011 UM 17 UHR C.T.

IM GROßEN HÖRSAAL



NETWORKS OF DYNAMICAL SYSTEMS

DR. BJÖRN SCHELTER

THE INSTITUTE OF PHYSICS

UNIVERSITY OF FREIBURG, GERMANY

In complex systems, networks are often used to characterize the underlying interacting dynamical systems. The network topology promises to shed light on basic mechanisms of the dynamical systems. In first principle modeling, the network topology is assumed to be known. The properties of the dynamical systems themselves remain to be investigated. This is referred to as the *direct problem*. The *inverse problem* is concerned with the estimation of the network topology based on observations of time series generated by the dynamical systems. For linear systems, multivariate time series analysis techniques are available for several years now. For nonlinear systems that can exhibit complicated interaction dynamics such as synchronization, first attempts towards network inference have been suggested only recently. In this talk, approaches to investigate the direct directed network structure from observations of nonlinear dynamical possibly chaotic systems will be discussed.