



# PHYSIKALISCHES KOLLOQUIUM



Mittwoch, 16.07.2014, um 16:00 Uhr

Ort: Reichenhainer Str. 90; Neues Hörsaalgebäude, Raum: 2/N013

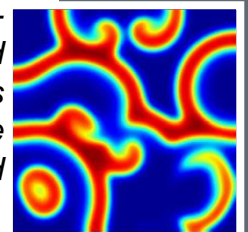
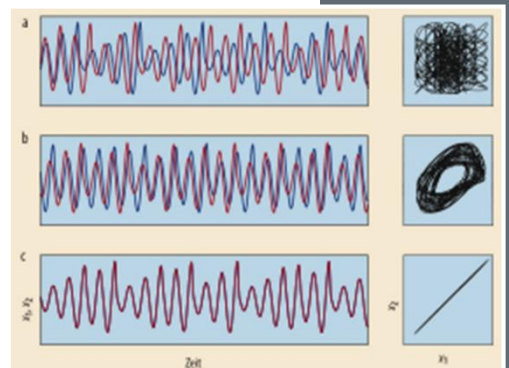
**Prof. Dr. Ulrich Parlitz**

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## Synchronization of dynamical systems

*Synchronization is an universal phenomenon that can be observed in many physical, biological, chemical, and technical systems. It often forms the basis of functional, collective behavior underlying natural processes, for example, in physiology and neural dynamics, as well as manmade applications. In the talk we shall briefly review the history of the concept of synchronization and fundamental dynamical features of coupled periodic nonlinear oscillators. Then, synchronization phenomena of chaotic systems will be presented, including chaotic*

*phase synchronization and generalized synchronization. Methods for detecting these forms of synchronization in experimental data will be discussed and illustrated by means of examples. Furthermore, we shall address synchronization of (and in) extended systems that can be key to structure formation. Finally, applications of synchronization for model evaluation and parameter estimation from time series will be presented.*



- [1] U. Parlitz et al., Schwingungen im Gleichtakt, Physik Journal 5, 33 (2006)
- [2] D. Rey et al., Accurate state and parameter estimation in nonlinear systems with sparse observations, Phys. Lett. A 378, 869 (2014)
- [3] S. Berg et al., Synchronization based system identification of an extended excitable system, Chaos 21, 033104 (2011)
- [4] A. Ahlborn and U. Parlitz, Experimental observation of chaotic phase synchronization of a periodically modulated frequency-doubled Nd:YAG laser, Optics Lett. 34, 2754 (2009)
- [5] H. Ulrichs et al., Synchronization and chaotic dynamics of coupled mechanical metronomes, Chaos 19, 043120 (2009)
- [6] L. Kocarev and U. Parlitz, Generalized synchronization, predictability and equivalence of unidirectionally coupled systems, Phys. Rev. Lett. 76(11), 1816 (1996).

Alle Zuhörer sind ab 15:45 Uhr zum Kaffee vor dem Hörsaal eingeladen.