



OTTO VON GUERICKE
UNIVERSITÄT
MAGDEBURG

NAT

FAKULTÄT FÜR
NATURWISSENSCHAFTEN

Physikalisches Kolloquium

Dienstag, 16:30 Uhr, G 16/Raum 215

03. Juli 2018

Prof. Dr. Ulrich Parlitz

Max-Planck-Institut für Dynamik und Selbstorganisation Göttingen

"Nonlinear Dynamics of the Heart"

Synopsis

Electro-mechanical excitation waves in the heart may exhibit different spatio-temporal dynamics ranging from repeated plane waves to scroll waves or spatio-temporal chaos, resulting in life threatening arrhythmias. This kind of chaotic dynamics in excitable cardiac media is often characterised by significant complexity fluctuations (including laminar phases) and can be non-persistent exhibiting supertransients, with lifetimes of the chaotic phases increasing exponentially with the system size. Terminating or at least shortening chaotic transients can be life saving in the medical context of cardiac arrhythmias. Therefore, we study the impact of perturbations on the duration of transients and features of the terminal phase of chaotic transients. Practically, such perturbations can be applied via so-called virtual electrodes where electrical heterogeneities of the cardiac muscle act as local excitation sites when subjected to a global electric field. In the talk we shall present novel results on the nonlinear dynamics of the heart including features of the terminal phase of transient chaos, parameter and state estimation, as well as experimental studies and modalities.

Magdeburg, d. 15. Juni 2018

gez. Prof. Dr. Jan Wiersig