



Institutskolloquium

Am Mittwoch, 9. Januar 2008 um 16:00 Uhr spricht

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über

“Ultrafast Spectroscopy and Control of Complex Systems”

Abstract: Ultrafast spectroscopy is widely used for studying time-resolved quantum phenomena, and active manipulation ("control") is also possible using shaped femtosecond laser pulses. However, with increasing complexity of the investigated systems the experimental and analytical challenges rise drastically, requiring new approaches. Several novel spectroscopy and control techniques and applications to complex systems will be presented. For example, coherent two-dimensional spectroscopy can be used to measure electronic couplings directly and follow energy transport through space and time with nanometer and femtosecond resolution. In quantum control, some new concepts are: an accumulative scheme for ultrasensitive femtochemistry of low-yield photoreactions; "reverse control" and systematic fitness landscapes for molecular wavepacket analysis; neural networks for automated computer modeling of light-matter interaction; time-resolved infrared spectroscopy for controlling photochemical reactions in liquids; and the von-Neumann phase-space representation for shaped laser pulses. Finally, it is even possible to overcome the optical diffraction limit and achieve subwavelength control of electromagnetic fields and forces as shown in simulations as well as recent experiments.

**Ort: Max-Born-Saal,
MBI, Max-Born-Str. 2a**

Prof. Dr. Th. Elsässer