



EINLADUNG zum IFP-SEMINAR

Long-range order in the ultrafast dynamics and in nonequilibrium steady states of correlated electron systems

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Host: Jan Kuneš
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Femtosecond laser technology has opened the possibility to probe and control the dynamics of complex condensed matter phases on ultra-short timescales. Non-equilibrium Green's functions and non-equilibrium dynamical mean-field theory [1] provide a versatile approach to study those out of equilibrium states in correlated matter from a microscopic perspective. This talk will be focused on the question how long-range electronic order can be manipulated, enhanced, or even induced out of equilibrium. We will show that in excitonic condensates, which are similar to BCS superconductors, the condensate fraction can be enhanced in an electronically excited non-equilibrium state, even when the energy of the state corresponds to temperatures above the critical temperature [2]. Furthermore, we study the steady state regime, in which the action of the laser on the electrons, or the driving of phonons which couple to the electrons, can be understood in terms of a Floquet-Hamiltonian with modified interactions. A Floquet Green's function approach allows us to address the steady state in which driving is balanced by dissipation [3], and to see to what extent nontrivial phases of the Floquet Hamiltonian such as superconductivity can be realized.

[1] H. Aoki et al., Rev. Mod. Phys. 86, 779 (2014).

[2] D. Golež, Ph. Werner, and M. Eckstein, Phys. Rev. B 94, 035121 (2016); S. Mor et al., Phys. Rev. Lett. 119, 086401 (2017).

[3] Y. Murakami, N. Tsuji, M. Eckstein, Ph. Werner, Phys. Rev. B 96, 045125 (2017).