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Nichtgleichgewichtsdynamik kondensierter
Materie in der Zeitdomäne

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Nonequilibrium properties of Mott insulators

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Mott insulators represent a paradigmatic system for studying the effects of strong electron correlations and have opened fundamental questions when driven out of equilibrium. When exposed to a constant or a pulsed electric field their insulating nature can be modified due to the creation of excitations, which can be represented with effectively charged holons and doublons. It is a great theoretical challenge to understand how charge carriers are created, but also how stable they are, on what time scales they relax, how they interact with other bosonic degrees of freedom, and eventually recombine.

I will present our contribution to the understanding of the dynamics of holons and doublons after being created, for example, in a pump-probe experiment. After giving a brief insight into the short-time (femto-second) dynamics of excited charges I will show that in two-dimensional systems the observed charge recombination can be quantitatively explained with emission of spin excitations. In one dimensional systems, on the other hand, the coupling to phonons plays an essential role. Both studies are unified under the conclusion that the recombination rate is exponentially suppressed with the number of bosonic excitations that are created during such a process.

Für diese Zeit steht eine Kinderbetreuung nach vorheriger Anmeldung zur Verfügung.

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