

## HL 2: Invited Talk Knorr

Time: Monday 10:15–11:00

Location: ER 270

**Invited Talk**

HL 2.1 Mon 10:15 ER 270

**Theory of Ultrafast Dynamics of Electron-Phonon Interactions: Semiconductor Quantum Wells, Surfaces and Graphene** — •ANDREAS KNORR<sup>1</sup>, STEFAN BUTSCHER<sup>1</sup>, NORBERT BÜCKING<sup>1</sup>, MARTEN RICHTER<sup>1</sup>, FRANK MILDE<sup>1</sup>, PETER KRATZER<sup>2</sup>, MATTHIAS SCHEFFLER<sup>3</sup>, and CARSTEN WEBER<sup>4</sup> — <sup>1</sup>Institut für Theoretische Physik, Technische Universität Berlin — <sup>2</sup>Fachbereich Physik, Universität Dortmund — <sup>3</sup>Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin — <sup>4</sup>Mathematical Physics, Lund University

Nanostructured semiconductors are ideal model systems to investigate

the dynamics of the electron-phonon coupling in different confinement potentials.

In this talk, the simultaneous quantum dynamics of electrons and phonons is described within a Liouville space formalism for the time evolution of the statistical operator. This approach allows the self-consistent description of non-markovian dynamics and non-perturbative interaction in ultrafast electron transfer and relaxation mechanisms.

Specific systems investigated are ultrafast electron transfer between bulk and surface states at silicon surfaces, strong electron-phonon interaction for intersubband optics in nitride quantum wells and quantum cascade lasers as well as hot phonon dynamics in graphene.