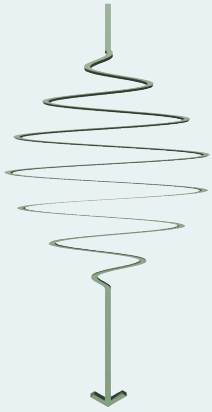
September 26th, 2012 - 11:00 am

Seminar Room, DESY Bldg. 90 (ZOQ)

CFEL SCIENCE

Max Planck Research Department for Structural Dynamics



SEMINAR

Dieter Jaksch

Clarendon Laboratory, University of Oxford

Atom Transport in Optical Lattices

The transport and coherence of atoms in optical lattices are strongly influenced by their interactions with a background gas which provides a reservoir to dissipate energy [1].
I will discuss two possible resulting applications: (i) quantum transport through lattices with an engineered and well controlled phonon bath, for example enabling the realization of non-markovian atom-bath couplings; and (ii) measuring transport properties for distinguishing different quantum phases of the background gas. I will also investigate the influence of dephasing on transport in a strongly interacting fermionic lattice gas and describe a many-body mechanism that leads to negative differential conductivity in these systems.
In addition I will briefly describe the main features of tensor network theory which is our main numerical tool for these studies.

[1] T. H. Johnson, S. R. Clark, M. Bruderer and D. Jaksch, "Impurity transport through a strongly interacting bosonic quantum gas", Phys. Rev. A 84, 023617 (2011).

UHH

Host: Andrea Cavalleri, MPSD-CMD, CFEL