

Theoriekolloquium

Am **5. Juli 2018** um **14.15 Uhr** in **W2 1-143** hält

Herr Prof. Dr. Holger Fehske (Greifswald)

einen Vortrag mit dem Titel

Quantum transport within a background medium: Fluctuations versus Correlations

Charge transport normally takes place in some background medium. To understand how the environment affects the moving carrier and vice versa is a difficult question and in this generality one of the most heavily debated issues in condensed matter physics. Parametrising the background by bosonic degrees of freedom, we propose a novel two-channel transport model which effectively captures this complex interplay. We first investigate the one-particle sector and present exact results for the optical conductivity, Drude weight, quasiparticle dispersion and particle-boson correlations for a 1D infinite system. Connections to the transport of lattice and spin polarons were established. Next we consider a finite particle density and determine the ground-state phase diagram and spectral properties of the Edwards fermion-boson model by means of the (dynamical) density-matrix renormalization group technique. Analysing the entanglement entropy and the charge structure factor we prove that the model exhibits a metal-insulator quantum phase transition for the half-filled band case. Thereby the metallic phase typifies a repulsive Luttinger liquid, while the insulating phase constitutes a charge density wave. Off half-filling the Luttinger liquid is attractive and finally makes room for a phase separated state, provided the charge carriers are coupled to slow quantum bosons. We finally address disorder effects and show how Anderson localisation competes with both metallicity and charge order.

Interessierte sind herzlich eingeladen.

gez. Prof. Dr. Martin Holthaus