

THEORETISCH PHYSIKALISCHES KOLLOQUIUM

Donnerstag, den 12.07.2017 um 15:30 Uhr in Raum 46-576

One-dimensional Bose polaron problem: Ground state, and Quench dynamics

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A low-energy particle in a medium can often be described as a polaron: a quasiparticle with renormalized impurity parameters. The polaron concept is ubiquitous in physics: It is employed to describe an electron in a polarizable crystal, a proton in a neutron star, etc. Moreover, presently there is a possibility to create and study polarons in cold-atom systems, which allows one to test theoretical calculations, especially in the strongly-interacting regime.

This talk presents the effective energy and the effective mass of the one-dimensional Bose polaron made of a structureless particle that interacts with a homogeneous infinite environment. The talk addresses the possibility of measuring these parameters in quench experiments with trapped Bose gases and discusses the necessity to extend the standard polaron model. It outlines other directions of future research, in particular, investigations of induced correlations in two-polaron systems.