

Eugene Wigner Colloquium

joint event of GRK 1558 and SFB 910



Dr. Andreas Alvermann

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“A computational perspective on the spin-boson model”

The spin-boson model, where a two-level system couples to a continuum of harmonic oscillators, provides a fundamental description of quantum tunneling in a dissipative environment. Despite its simplicity it features a number of interesting effects, including a quantum phase transition from a delocalized to a localized ground state.

In my talk I will discuss how to actually compute the properties of the spin-boson model and of more general open quantum systems. The key idea behind our approach is the integration of orthogonal polynomial expansions, the sparse grid concept, and the dynamical semi-group formalism into a single numerical technique. This technique complements the more common renormalization group or path integral approaches. Using the highly accurate data it provides for static and dynamic observables I will try to answer two questions: What are the critical exponents of the sub-ohmic quantum phase transition, and how do non-Markovian effects manifest themselves in the spin dynamics?

Thursday, 13.02.14 · 16:15h · EW 202

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