



Location University of Regensburg, Dept. of Physics
Room PHY 5.0.21

Time Thursday, 2nd February 2012
3:15 p.m.

Speaker **Prof. Dr. Joachim Ankerhold**
Dept. of Theoretical Physics, University of Ulm

Title Dynamics of open quantum systems beyond weak coupling

Abstract The description of open quantum systems is well established in the regime of weak coupling to a surrounding reservoir, often realized e.g. in quantum optical set-ups. Recent experimental progress to fabricate and to manipulate large solid state quantum circuits in various regimes (weak-strong coupling, high-low temperatures, tailored surroundings) as well as the interest in quantum effects in complex condensed phase aggregates challenge theory to develop new approaches and tools. While in principle for stronger interaction and non-Markovian dynamics formally exact expressions exists for the reduced density matrix e.g. in terms of path integrals, explicit evaluations are extremely demanding. In this talk I will discuss complications, possible solutions, and their advantages and drawbacks. In particular, two powerful numerical methods, namely, the path integral quantum Monte Carlo technique (PIMC) and the stochastic Schrödinger equation (SSE), will be presented in detail together with recent (and future) extensions and applications. These include correlated charge transfer, spin-boson physics for subohmic baths, coherent state propagation, and optimal control.

Contact: Prof. Milena Grifoni, Phone 2035