SFB/TRR 21 - Colloquium

11. Februar 2011, Stuttgart

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## Keeping the coherence of quantum bits by optimized dynamical control

Decoherence, i.e., the loss of coherence, is a deep conceptual issue as well as a severe nuisance on our way to put quantum information to use. Dynamical decoupling is a very important tool for the suppression of decoherence. Repeated switching of the qubit averages the detrimental coupling between qubit and environment to zero. The optimization of the necessary sequence of control pulses makes dynamical decoupling much more efficient. In this talk results are derived for dephasing and longitudinally relaxing environments. These results are by now verified experimentally and even proven mathematically. Further issues for the applications under realistic circumstances, such as finite pulse duration or power-law spectra, are also discussed.

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