



Einladung zum Physikalischen Kolloquium

**Montag, 31.01.2011,
16.15 Uhr, H2 (025)**



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**Entanglement, Gates and Communication
Mediated by a Spin Chain**

In this talk, I will first present an overview of some ideas of using a spin chain as a data-bus for linking quantum registers. I will then describe some recent work on how quantum entanglement may be established between the distant ends of a spin chain by exploiting non-equilibrium dynamics following a quench. Both global and local (bond) quenching can generate substantial entanglement so that such chains would enable transmitting quantum states through teleportation. The latter quench also exploits interesting aspects of Kondo physics. I will end the talk describing some very recent work on enabling quantum gates and entanglement enhanced quantum communication protocols in spin chains simulated by ultra-cold atoms in optical lattices.