SFB/TRR 21 - Seminar
18. Juni 2009, Ulm

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Perfect state transfer and Entanglement generation and distribution in ferromagnetic long-range interacting spin chains

We propose to use ferromagnetic systems for entanglement generation and distribution together with perfect state transfer between distant parties in a qubit chain. The scheme relies on an effective 2-qubit dynamics, realized by leaving two empty sites in a uniformly filled chain.
This allows long-range interacting qubit chains to serve as quantum channels for both tasks with optimal performances. Remarkably, the entanglement between sender and receiver sites is independent of both the transmission distance and the system size. This property opens new perspectives for short and mid-range quantum communication with qubit chains.

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