SFB/TRR 21 - Seminar
21. Juli 2009, Ulm

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Quantum versatility in rare-earth crystals

The rare-earth elements are known for their good coherence properties, which arise from having the active transitions shielded by closed, outer-lying shells. Doped into solid hosts they become inhomogeneously broadened, while keeping their long coherence times individually. Complimented by suitable preparations and robust pulse-shaping, this turns out to be a very interesting system for a wide variety of applications related to quantum computing and quantum communication. Here, I present recent results in these materials from Lund University, which include EIT and slow light effects, ensemble-based qubit gates, performed with >90% fidelity and quantum memories with >20% overall efficiency.

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