



EINLADUNG

zum Vortrag
von

Dr. Dietrich Leibfried

National Institute of Standards and Technology, Boulder, CO USA

Towards scalable quantum information processing and quantum simulation with trapped ions

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Ort: Lise-Meitner-Hörsaal, Fakultät für Physik, Universität Wien,
1090 Wien, Strudlhofgasse 4 / Boltzmannngasse 5, 1. Stock

Barrierefreier Zugang: Boltzmannngasse 5, Lift, 1. Stock rechts über den Gang zum Hintereingang des Hörsaals

Abstract:

I will discuss experiments towards Quantum Information Processing (QIP) and Quantum Simulation (QS) with trapped ions. Most requirements for QIP and QS have been demonstrated in this system, with two big challenges remaining: Improving operation fidelity and scaling up to larger numbers of qubits.

The architecture pursued at the Ion Storage Group at NIST is based on quantum information stored in long lived internal (hyperfine) states of the ions. We investigate the use of laser beams and microwave fields to induce both single-qubit rotations and multi-qubit gates mediated by the Coulomb interaction between ions. Moving ions through a multi-zone trap architecture allows for keeping the number of ions per zone small, while sympathetic cooling with a second ion species can remove energy and entropy from the system.

After a brief introduction to these elements, I will present the current status of experiments and some future perspectives for QIP and QS as well as for other applications based on trapped ions.

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