EINLADUNG
ZUM LASER- UND QUANTENOPTIKSEMINAR

Am Freitag, 11.05.2012, um 10:00 Uhr
Raum 46/387-388

Es spricht: PD Dr. Kilian Singer
Johannes Gutenberg-Universität Mainz

Thema:
”Novel ion traps for deterministic ion implantation and quantum simulation”

Microstructued ion traps allow for the deterministic, high resolution implantation of individual laser-cooled ions, and can operate with sympathetically cooled ion species, isotopes or ionic molecules. They therefore offer the basis of an atomic nano-assembler — a device capable of placing an exactly defined number of atoms or molecules with sub millikelvin energies into solid state substrates with sub-nanometre precision in depth and lateral position.

Motivated by the general interest in tailored solid-state quantum materials, I present our steps towards deterministic generation of colour centres or quantum dots that can be placed in well-defined geometries to exploit their mutual coupling.

I will also present new planar and three-dimensional trap geometries which allow for the application of variable rf fields for precise positioning of ions in two dimensions. These geometries are of great interest for realizing two-dimensional ion crystals with controllable interactions, and enable novel schemes for the quantum simulation of solid-state spin systems with laser-cooled trapped ions. Additionally a novel trap design for the realization of a thermodynamic heat engine with a single ion; simulations and the experimental setup will be shown.

Der Gast wird betreut von Prof. Dr. H. Ott

GÄSTE SIND HERZLICH WILLKOMMEN!