



Kolloquium

Prof. Dr. Ignacio Cirac
(MPI Garching)

Trapped ions for quantum simulations and computations

Trapped ions provide us with an almost ideal setup to implement a quantum computer. In particular, when loaded in linear traps or in microtraps one can devise methods to perform simple quantum computations with them. In this talk I will show how it is possible to use trapped ions to perform quantum simulations of magnetic and bosonic systems. The main idea is to manipulate their motion using lasers so that the resulting system is described by an effective Hamiltonian which coincides with the one one wants to simulate. In this sense, one could perform experiments with trapped ions similar to those that are currently being carried out with atoms in optical lattices, and observe, for example, quantum phase transitions. Finally, I will mention how it is possible to simulate some quantum-many problems with a classical computer by using methods developed in the context of quantum information theory.

Wann? Donnerstag, 02.02.2006, 17:15 Uhr

Wo? Universität Ulm, Raum N24/H16