



# **Einladung zum Physikalischen Kolloquium**

**Montag, 15.6.2009  
16.15 Uhr, H2 (O25)**

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## **“Quantum Information Processing and Raising Schrödinger’s Cat”**

**Abstract:**

Two discrete energy levels in a quantum system, such as an atom, can be used to store a bit of information. However, quantum systems can also exist in superposition states, thereby storing both states of the bit simultaneously. This property of “qubits” leads to an exponential increase in memory and processing capacity. It would enable a quantum computer to efficiently solve certain problems, such as factorizing large numbers, which are impractical on a classical computer. Realization of a useful quantum computer is probably decades away due to the necessity of sufficiently suppressing decoherence. Nevertheless, in the near term, the principles of quantum information processing are finding applications in metrology, such as for atomic clocks. Moreover, even a small quantum computer would realize a mesoscopic analog of “Schrödinger's Cat,” a bizarre situation put forth by Schrödinger in 1935 where a cat could be simultaneously dead and alive. A number of physical systems are currently considered for building a quantum information processor; this talk will focus on the use of trapped atomic ions.

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