



# **Einladung zum Physikalischen Kolloquium**

**Montag, 21.12.2009  
16.15 Uhr, H2 (O25)**

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**„Schrödinger´s Mirror´s  
How to put mechanics back into quantum mechanics”**

Nano- and micromechanical resonators are about to become a new paradigm system for quantum science. They combine features that allow unique approaches to both quantum foundations and quantum applications. For example, their flexibility to couple to a variety of physical systems (photons, electrons, atoms etc.) promises novel transducer schemes for quantum information processing. At the same time, their mass and size allows access to a hitherto untested parameter regime of macroscopic quantum physics such as quantum superposition states involving objects that are visible to the bare eye. Quantum optics provides a well-developed toolbox to enter and control the quantum regime of mechanical systems, in particular when exploiting radiation pressure effects inside optomechanical cavities. I will briefly highlight the recent developments of the field including effects such as laser cooling of micromechanical resonators towards the quantum ground state or strong optomechanical coupling to achieve coherent quantum control. I will also report our recent progress in Vienna towards generating optomechanical quantum entanglement, which is at the heart of Schrödinger's cat paradox. Finally, I will discuss the relevance of truly macroscopic quantum superpositions for our understanding of quantum physics.