

EINLADUNG  
ZUM LASER- UND QUANTENOPTIKSEMINAR

**Am Freitag, 20.01.2017, um 10:00 Uhr**

**Raum 46-387/388**

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**Quantum Sensors with Cold Atoms**

Developing new quantum sensors is one of the biggest challenges in today's quantum technology. Thereby, quantum fluctuations play an important role as they provide direct access to the quantum information of a system. Sensitive single particle detection with high temporal resolution, as realized in our experiments, is thus of specific importance.

In my talk, I will give several examples for cold atom based sensing schemes. Their applications range from surface topography and force spectroscopy up to electro-magnetic noise spectroscopy. The latter allows for measuring field fluctuations by transferring them onto an atom laser and analyzing its output on the single particle level. In a first experiment, we successfully transferred classical field noise of a multi-mode microwave field onto the atom laser and reconstructed the power spectral density and the intensity correlations of the microwave field. A quantum galvanometer comes thus into direct reach, which should allow for investigating quantum transport phenomena in various solid state systems.

In view of new sensing schemes, we also developed a novel quantum microscope. It is based on an ion-optical imaging system with a magnification up to 1000 and a resolution in the sub- $\mu\text{m}$  regime. It is well suited to measure spatial and temporal correlations in cold quantum and Rydberg gases, which might help to investigate novel order phenomena like Rydberg crystallization.

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

GÄSTE SIND HERZLICH WILLKOMMEN!