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# Seminar über Quanten-, Atom- und Neutronenphysik (QUANTUM)

July 14, 2022 at 2 p.m. c.t.  
IPH Lorentzraum 05-127

Dr. Robert Löw  
GEPRIS Universität Stuttgart

## **Optical non-linearities in hot atomic vapours**

The research and the spectroscopy of hot vapors carries great potential, ranging from fundamental research to robust applications in the context of quantum technologies.

In the past decades the spectroscopy of atomic and molecular gases at room temperature has lost some attention due to the focus on cold atomic systems. Still, due to their experimental simplicity, their robustness, and their fundamental nature, they hold the promise to realize real-world quantum devices. Their narrow-band transitions and high optical depths enable such vapor cell science to implement excellent sensors, reference and metrologic devices or building blocks in quantum optics.

In this talk I will focus on optical non-linearities induced by atom-atom interactions, either by highly excited Rydberg states or for low lying states via the resonant dipole-dipole interactions. These non-linearities are manifest at the single photon level and can be exploited to generate and process non-linear light fields. As a platform we use a variety of cell types, where the most advanced ones involve integrated photonic waveguides and microresonators.

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