



CRC 1227  
Designed Quantum States of Matter



## GUEST LECTURE

**Prof. Dr. Andreas Hemmerich**

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Institute of Laser Physics, Atom Optics Group  
(Guest of Prof. Dr. Piet O. Schmidt)

Leibniz Universität Hannover  
Welfengarten 1, 30167 Hannover  
(building 1101)  
Seminar room D326  
at the Institute of Quantum Optics  
10 January, 2019, 3:30 pm

**"At the interface between quantum optics and quantum many-body physics"**

Ultracold atoms interacting with an optical cavity provide a versatile platform to emulate elementary physical scenarios in the laboratory at the interface between quantum optics and quantum many-body physics, where light and matter give rise to a fascinating non-linear interplay. After a tutorial introduction I will discuss a series of remarkable and sometimes useful examples: cavity cooling below the recoil limit, non-destructive in-situ monitoring of Bloch oscillations, matter wave superradiance, non-equilibrium dynamics in the open Dicke model, cavity-induced self-organized Mott-insulator, and dynamical melting of a cavity-induced density wave phase.

**All DQ-mat members and all interested  
are cordially invited to attend.**