



CRC 1227
Designed Quantum States of Matter



GUEST LECTURE

Prof. Dr. Klaus Hornberger

Faculty of Physics
at University of Duisburg-Essen
(Guest of Prof. Dr. Klemens Hammerer)

Leibniz Universität Hannover
Welfengarten 1, 30167 Hannover
(building 1101)
Seminar room D326
at the Institute of Quantum Optics
31 May, 2018, 3:30 pm

"Optomechanics of levitated nanoparticles"

My talk will discuss the classical and quantum physics of optically levitated nanoparticles, focussing on objects whose rotation and alignment can be optically addressed. I will review the experimental state-of-the-art regarding rotational control, and present the prospects of cavity cooling the ro-translational state of motion into the quantum regime. A theory describing environmental effects such as decoherence, friction, and diffusion of the orientational degrees-of-freedom will be outlined. Based on this, I will finally propose an experiment creating and probing a macroscopic superposition of different orientation states.

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