



CRC 1227
Designed Quantum States of Matter



GUEST LECTURE

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(Guest of Dr. N. Gaaloul and Prof. K. Hammerer)

Leibniz Universität Hannover

DQ-mat Colloquium

Thursday, 30 May 2024, 4.00 pm

Room D326, Welfengarten 1, building 1101

"Modeling and Simulations of Systematics for Atom Interferometers"

Atom Interferometers utilize ultracold atom systems in degenerate quantum states to produce highly sensitive quantum sensors. Operating many such systems simultaneously allows for differential measurements providing more sensitivity to time dependent signals.

With very-long-baseline atom interferometers on the horizon and in development, such as AION, MAGIS-100, MIGA, ZAIGA, VLBAI, and ELGAR, it is important to thoroughly investigate the noise sources and systematics arising from these new scales (10-1000 m) and environments, such as mine shafts and deep underground laboratories. We focus on effects caused by seismic and atmospheric density fluctuations, and laser wavefront distortions, and explore the modeling and simulation techniques that may provide better representations of long-baseline atom interferometer many-body dynamics. Focus will be given to the current methods of simulating effects in atom interferometry and discussing findings on the impact of Earth sourced gravity gradient noise for proposed tests of fundamental physics using atom interferometer gradiometers.

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