CRC 1227
Designed Quantum States of Matter

GUEST LECTURE

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at TU München
(Guest of Prof. Dr. Ernst. M. Rasel
and Dr. Dennis Schlippert)

Leibniz Universität Hannover
Welfengarten 1, 30167 Hannover
(building 1101)
Seminar room D326
at the Institute of Quantum Optics
16 November, 2017, 3:30 pm

"Precision measurements in small magnetic fields"

Since the 1950's people search for electric dipole moments (EDM) of fundamental systems, an unambiguous manifestation of parity (P) and time reversal symmetry (T) violation. Assuming the conservation of CPT, T violation in a fundamental system also means CP violation. This has only been observed in very few systems in the Standard Model of particle physics (SM) and is not sufficient to describe the matter-antimatter asymmetry in the Universe. With a long history of innovation and persistence, the neutron EDM dn is now limited to below 3·10−26 e·cm, an extraordinarily small number, corresponding to an energy resolution of 10-22 eV. The effort to develop a next generation of searches for the time-reversal-symmetry violating electric dipole moment of the neutron triggered a variety of technologic advances. One particularly critical aspect, which happened although almost unnoticed over the last years, is the quality of ultra-low magnetic fields and shielding.
In my talk I will discuss challenges in the field of EDM searches, present the spin clock work at TUM and its perspectives, and then specifically focus on our magnetic field developments and their applications emerging in fundamental physics and industry.

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