CRC 1227
Designed Quantum States of Matter

Leibniz Universität Hannover

GUEST LECTURE

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(Guest of Dr. Tanja Mehlstäubler)

Physikalisch Technische Bundesanstalt
Bundesallee 100, 38116 Braunschweig
RZB Building, Room 113
09 May 2019, 3:30 pm

Spin squeezing in a metrologically relevant regime

Spin squeezing is a fascinating as an application of entanglement: atoms conspire to reduce statistical fluctuations in a quantum measurement. In real-life metrological devices, the concept is attractive for situations where the atom number cannot be increased easily, such as trapped-atom clocks and sensors. Existing proof-of-principle experiments have impressively demonstrated quantum enhancement by various spin squeezing schemes. However, stability levels in these experiments do not exceed that of a standard quartz oscillator yet, and the lifetime of the squeezed states is generally short. I will present progress towards an entanglement-enhanced trapped-atom clock on a chip (TACC), performed in collaboration between LKB and SYRTE in Paris, with the goal of testing spin squeezing and QND detection in the stability range below 10^-12 s^-1/2.

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