



CRC 1227
Designed Quantum States of Matter



GUEST LECTURE

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(Guest of Prof. P.O. Schmidt and Prof. K. Hammerer)

**DQ-mat Colloquium
Physikalisch Technische Bundesanstalt
Bundesallee 100, 38116 Braunschweig,
Maria-Goeppert-Mayer-Bau (RZB XI), Room 113
Tuesday, August 22, 2023, 4 pm-5 pm**

**"Cs vapor microcell optical frequency reference based on dual
frequency sub-Doppler spectroscopy"**

This presentation reports the development and characterization of an optical frequency reference at 895 nm based on the interrogation of cesium atoms confined in a microfabricated cell using dual-frequency sub-Doppler spectroscopy. Two nearly-identical laser systems were developed, one using a DFB diode laser and the other with an external cavity diode laser (ECDL). The beatnote between these two lasers was limited by the more unstable of the two. An ultra-stable frequency reference at 895 nm was developed to unambiguously characterize the individual performance of the microcell ECDL. The latter is based on an annex ECDL, phase-locked to a spectrally-broadened frequency comb, referenced to an ultra-stable Fabry-Perot cavity-stabilized 1542 nm laser. A compensated fiber link was then developed to transfer the reference signal to the microcell ECDL's laboratory, allowing its characterization. In a last step, preliminary studies were initiated to measure the sensitivity of the laser frequency to variations in some experimental parameters.

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