



CRC 1227
Designed Quantum States of Matter



GUEST LECTURE

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DQ-mat Colloquium

Thursday, 11 July 2024, 4.00 pm

**Vieweg-Building, Room 133
Physikalisch-Technische Bundesanstalt
Bundesallee 100, 38116 Braunschweig**

" Fundamental physics searches with precision spectroscopy of ytterbium "

Ytterbium (Yb) is one of the most popular atomic species in the field of atomic physics. One of the main research topics with Yb is precision spectroscopy, both with neutral atoms and with Yb⁺ ions. Attempts of making the world's most accurate clock with them are so successful that these accurate clocks can now be utilized as quantum sensors for fundamental physics through faint interaction between dark matter, hypothetical particles, or higher-order effect of the Standard Model. In this talk, I will describe our recent efforts on utilizing a conventional Yb optical lattice clock and precision spectroscopy of newly observed 431 nm transition for fundamental physics searches. Long-term operation of our ytterbium allowed us to search for ultralight dark matter together with an operation of a Cs fountain clock. We performed an initial search and characterization of the 431 nm transition by absolute frequency measurements, and the data are interpreted from viewpoints of nuclear physics and a search for new forces between neutrons and electrons.

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