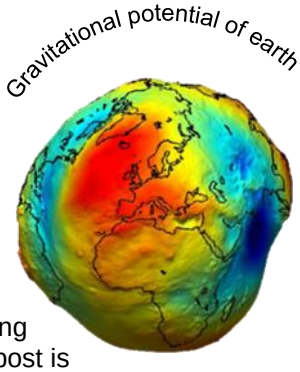
The Physikalisch-Technische Bundesanstalt (PTB) is the National Metrology Institute of the Federal Republic of Germany with scientific and technical service tasks. It furthers progress and reliability in metrology for society, the economy and science. The QUEST Institute for Experimental Quantum Metrology is a joint institution of Leibniz Universität Hannover and PTB Braunschweig. The research revolves around quantum logic techniques for spectroscopy, optical clocks, and tests of fundamental physics with trapped ions

At the QUEST Institute, we are looking for a

doctoral candidate in the field of optical clocks (85% TVöD)



to join us as soon as possible.

Today's optical clocks feature a relative instability of better than 10^{-17}, making them the most precise measurement devices in existence and facilitating the direct measurement of earth's gravitational potential on the level of centimeters. The accuracy of optical clocks is a consequence of the near-perfect control of the fundamental quantum dynamics of single atomic systems. As a member of the QUEST institute, you will contribute to the development of state-of-the-art optical clocks and devise novel methods of manipulating atomic systems to extend this control and to harness it for practical clock operation. The post is initially limited to three years; an extension of the contract is possible. You will be employed at our Braunschweig site. The remuneration will be paid in accordance with remuneration group 13 TVöD Bund (85 %).

We offer:

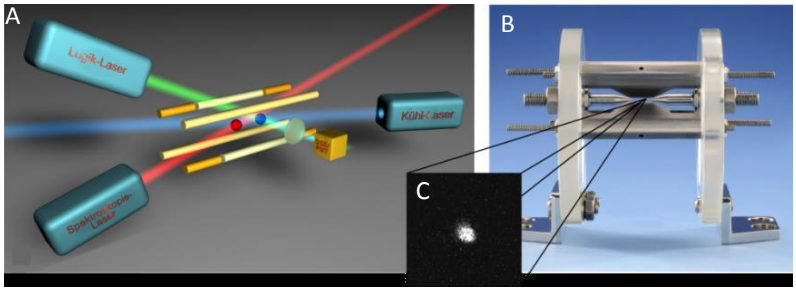
- An excellent research environment embedded in several coordinated research projects (CRC1127 DQ-mat, CRC1128 geo-Q) and with access to PTB's unique infrastructure
- Hands-on training in modern experimental techniques of laser and quantum physics, and actively contribute to the development of experiments at the forefront of quantum physics research
- Possibility to present scientific results on international conferences
- We encourage research stays abroad with our international collaborators

Your Tasks:

- Evaluation and operation of a quantum-logic clock based on Al^+
- Miniaturizing laser systems and optical set-ups for a transportable clock
- Using this clock for clock comparison and applications in geodesy
- Implementing concepts for highly stable references with large ionic crystals
- Developing and implementing quantum algorithms to improve the measurement accuracy

Your Profile:

- You have obtained an excellent university degree in physics (Master or German "Diplom")
- You are interested in developing and realizing precision experiments
- You are highly committed and capable of working autonomously in a team and you are willing to improve your skills
- You are a team player and have good communication skills
- You have a very good command of both spoken and written English and German
- Sound knowledge of atomic physics and experience in the field of quantum optics, laser cooling, laser spectroscopy or related subjects is advantageous
- You have the physical ability to work in a laboratory and to perform experiments outside the institute



A: Quantum logic scheme, **B:** Ion trap, **C:** Image of a single trapped Ca^+ ion

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