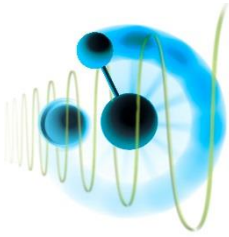
The Physikalisch-Technische Bundesanstalt (PTB) is the National Metrology Institute of the Federal Republic of Germany with scientific and technical service tasks. It furthers progress and reliability in metrology for society, the economy and science. The QUEST Institute for Experimental Quantum Metrology 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 quantum logic spectroscopy of molecules (85% TVöD)



to join us as soon as possible.

The complex structure of molecules poses a challenge for applications of spectroscopy. Molecules in general do not feature closed electronic transitions so that techniques like optical pumping and laser cooling, that allow high precision spectroscopy on atomic systems, are not employable for molecular systems. To tackle this challenge, we develop methods for spectroscopy of molecules that rely on techniques from quantum information processing. For this we trap a single molecular ion and an atomic ion in a common potential and use quantum logic operations to control and read out the molecular ion.

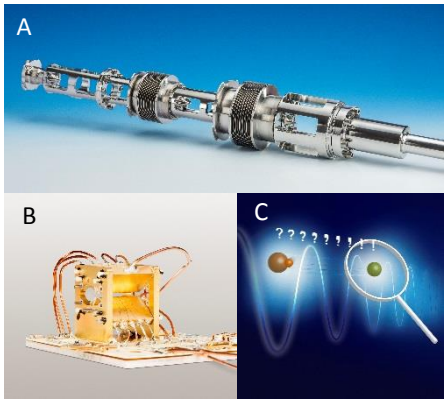
The post is initially limited to three years; an extension of the contract is possible. You will be employed at our Braunschweig site. The remuneration will be paid in accordance with remuneration group 13 TVöD Bund (85 %).

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 active contribution 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:

- Developing and implementing quantum logic based state preparations of the internal states of molecular ions
- Use of non-conventional motion states for efficient preparation and detection of internal states
- First-time implementation of spectroscopy using trapped molecules with previously unattained resolution



A Molecular beam for loading ions,
B Newest generation of our ion trap,
C A Mg ion is employed to read out the molecule

Your Profile:

- You have obtained an excellent university degree in physics
- 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

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