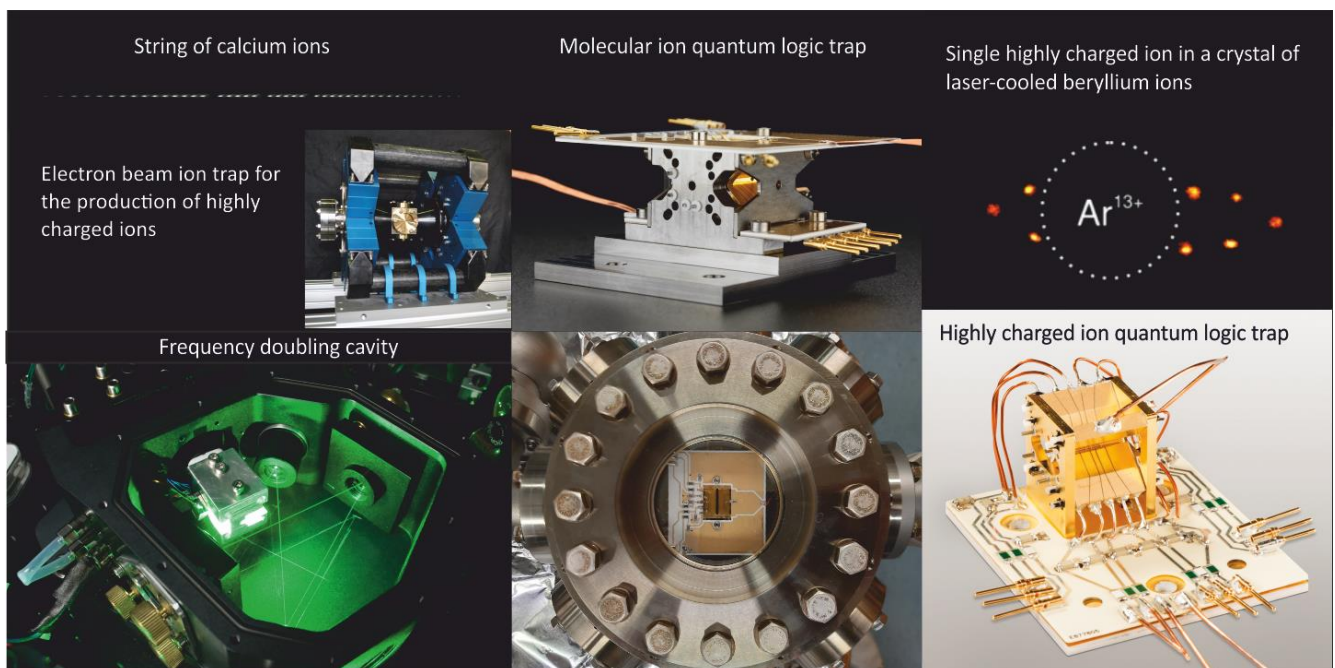


The Physikalisch-Technische Bundesanstalt (PTB) is the National Metrology Institute of the Federal Republic of Germany with scientific and technical service tasks. It furthers progress and reliability in metrology for society, the economy and science. The QUEST Institute for Experimental Quantum Metrology 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 (85% E13 TVöD)

to join us as soon as possible.



The ability to cool atoms using lasers to temperatures close to absolute zero led to a new era of precision spectroscopy, where the Doppler shifts from atomic motion are almost completely eliminated. This paved the way to breakthroughs in atomic clocks and precision tests of fundamental physics at very low energies. However, only a handful of species can be directly laser cooled. At the QUEST Institute, we are developing novel spectroscopy experiments based on techniques initially developed in the context of quantum information processing.

We overcome the inability to directly cool our spectroscopy species by employing the techniques of sympathetic cooling and quantum logic, opening an enormous range of otherwise inaccessible new species to the cutting-edge tools of precision optical metrology. This will allow tests of fundamental physics at unprecedented levels of precision and accuracy, such as searching for time-variation of fundamental constants and searching for a previously unknown “fifth force”, and could lead to the development of new atomic clocks with the potential to surpass the present state-of-the-art.

The advertised position will deal with quantum logic spectroscopy of one of the following systems:

- Aluminium ions for the realisation of an optical clock with unprecedented accuracy (S. Hannig et al. Rev. Sci. Instrum. 90, 053204 (2019))
- Molecular ions e.g. O^+_2 to probe for a possible variation of fundamental constants (Wolf et al., Nature 530, 457, (2016))
- Highly charged ions e.g. Ca^{14+} for a new type of optical clock with high sensitivity to probe for physics beyond the standard model (Micke et al. Nature 578, 60 (2020))

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 (CRC 1227, Excellence Cluster 2123, Max-Planck-Riken PTB Centre TCFS) with access to PTB's unique infrastructure
- Possibility to present scientific results at international conferences
- We encourage research stays abroad with our international collaborators

Your profile:

- You have obtained an excellent university degree in physics
- You are interested in developing and realising precision experiments
- You are highly committed and capable of working both autonomously and together as part of a team, and you are willing to improve your skills
- You are a team player and have good communication skills
- 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

Contact:

Prof Dr. Piet O. Schmidt
Tel.: +49 (0)531 592 4700,
piet.schmidt@quantummetrology.de

Link to job offer

[Link](#)



<http://www.quantummetrology.de/quest/home/jobs.html>

<http://www.quantummetrology.de/quest/eqm>

http://www.pro-physik.de/details/physikjournalArticle/2055715/Spektroskopie_aber_logisch.html



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