

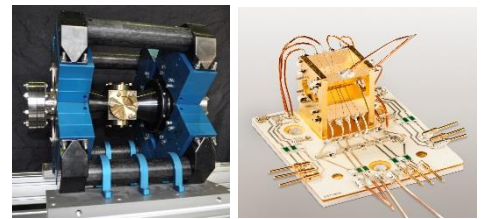
The Physikalisch-Technische Bundesanstalt (PTB) is the National Metrology Institute of the Federal Republic of Germany with scientific and technical service tasks. It furthers progress and reliability in metrology for society, the economy and science. The QUEST Institute for Experimental Quantum Metrology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

to join us as soon as possible.

Highly charged ions (HCIs) are ubiquitous in the observable universe and have many favourable properties for tests of fundamental physics and use as next-generation optical clocks. Recent breakthroughs in our group, working closely together with the Max-Planck-Institute for Nuclear Physics (MPIK Heidelberg), have enabled the first ever demonstration of optical clock-like spectroscopy on an HCI. This yielded a leap of nine orders of magnitude in precision over the previous state-of-the-art. We will now work towards taking full advantage of the system by demonstrating operation with several different ion species and targeting measurements at competitive levels of accuracy to the very best atomic clocks worldwide.



**Left:** electron beam ion trap, used for production of highly charged ions  
**Right:** cryogenic linear ion trap, used to store cold ions for spectroscopy

The post is initially limited to three years; an extension of the contract is possible. You will be employed at our Braunschweig site.

### Your tasks:

- Participating in the ERC project titled 'FunClocks' and in other international cooperation projects
- Setting up an electron beam ion trap (EBIT) with an integrated optical resonator to investigate Doppler-free spectroscopy of HCIs in close cooperation with the Max Planck Institute for Nuclear Physics (MPIK), Heidelberg
- Participating in developing quantum logic search techniques to enable the rapid identification of narrow optical transitions in HCIs
- Performing optical frequency measurements at the technological limit
- Developing optical clocks based on HCIs with an uncertainty of  $10^{-18}$
- Presenting the scientific results at international conferences

### Your profile:

- You have completed your university studies (master's degree or German Diplom) in physics or a comparable field with a very good degree.
- You are interested in developing and performing high-precision experiments.
- You are highly committed and capable of working autonomously.
- You are a strong team player with excellent communication skills.
- You have a very good command of spoken and written English.
- A good knowledge of atomic physics, quantum optics, laser cooling, laser spectroscopy, or related fields would be an advantage.
- You are willing to travel within Germany and abroad within the scope of your assignment.
- You must have the physical ability to work in a laboratory and perform experiments at external sites.

Further information about the position and the project, along with a link to the application form, can be found using the QR Code below or at <https://www.quantummetrology.de/home/jobs/>.

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