Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

The art of measurement — made in Germany. Striving to perfect it is the mission of the 2,200 employees of PTB, the Physikalisch-Technische Bundesanstalt. As Germany's national metrology institute and a leading center of research, we operate in an international environment to develop world-class measurement standards. We at PTB work to ensure that people and organizations can trust the measurements they use.

At our Braunschweig site, we are looking to fill the following position in Department 4.4 (Time and Frequency):

Doctoral candidate in physics – Optical Clocks

Remuneration Group 13 TVöD Bund ○ Three-year fixed term ○ Part-time (33.15 hours/week)

Your tasks:

This work will involve the further development of an optical clock based on the electric octupole transition of Yb^+ ions. Sympathetic cooling with Sr^+ ions confined in the same ion trap promises to achieve particularly long coherent interrogation times and in turn to resolve even the smallest frequency shifts. The special electronic structure of the Yb^+ ion makes it well-suited for investigating various fundamental physics questions. Following this idea, the group has already determined sharp limits for possible violations of the equivalence principle. Your primary tasks in Working Group 4.43 will include:

- Investigating the scalability of the optical clock through the simultaneous interrogation of multiple ions by various means, including entanglement
- Developing protocols for addressing single ions within a Coulomb crystal
- Determining systematic frequency shifts, e.g. those resulting from sympathetic cooling
- Investigating coherence-limiting effects with multiple ions
- Expanding the existing Python-based experimental control system with ARTIQ
- Expanding existing laser setups
- Performing, evaluating, and analyzing comparison measurements with other optical clocks to verify the systematic uncertainties and to identify violations of the equivalence principle and other effects beyond the standard model
- Presenting and publishing the research results

Your profile:

- You have completed your university studies (master's degree or German *Diplom*) in physics.
- You will ideally possess knowledge and experience in the following fields: atomic physics, atom-light interaction, laser cooling of atoms, laser spectroscopy, experimental optics, automated data acquisition, electronics, and programming.
- You are highly committed and capable of working independently.
- You are a strong team player with excellent communication skills.
- You have an excellent command of English (C1 level). German language skills would be an advantage.
- You are willing to travel for work both in Germany and abroad.

We offer:

- Support for your doctoral work: You will carry out research as part of an internationally renowned team and will benefit from PTB's excellent infrastructure. At PTB, you will be able to concentrate on your doctoral work without having to give lectures. Our support program for doctoral candidates additionally gives you the opportunity to network with your peers at the national and international levels, for example, at scientific conferences.
- Work-life integration: We offer flexible working arrangements and conditions (part time, flextime, work from home, telework, compensation days) to help you manage your family, care and career responsibilities in all of life's phases.
- Transparent terms: Remuneration in accordance with Germany's collective agreement for federal-level public service employees (TVöD Bund), 30 days of paid vacation and an employment-based pension plan for employees covered by the collective agreement are just some of the benefits of working at PTB.
- Location benefits: Our attractive campus offers an easy commute for drivers and cyclists as well as very good direct bus services. Plenty of free parking is available.
- Jobticket: We take environmental and climate protection seriously. To encourage commuting by public transportation, we offer a subsidy towards the cost of the *Deutschlandticket Job*.
- Family friendly: From daycare and dedicated parent-child offices to school holiday childcare, we offer a variety of ways to help you master the family-work balancing act.
- Inclusion: For people with disabilities, we offer an inclusive corporate culture and a range of integrative programs.
- Learning opportunities: We want to help you get ahead by offering a wide range of training and development programs to expand and enhance your skills.
- Health options: Your health is important to us, which is why we offer health promotion and maintenance programs, including workplace sports, a mobile massage service and back care classes.
- Canteen: Situated on our park-like campus grounds, our canteen offers a wide variety of culinary choices every day, including vegetarian/vegan options.

This is important to us:

PTB promotes gender equality and strongly encourages applications from female candidates. At the same time, we strive to reflect the diversity of our society. We therefore welcome every application submitted, regardless of the candidate's gender, cultural or social background, religion, ideology or sexual identity. If equally suited to the position, disabled persons or persons having equivalent status under German law will be given preference.

Your application:

For subject-related questions concerning this position, please contact Department 4.4:
Dr. Nils Huntemann, phone: +49 531 592-4430, email: nils.huntemann@ptb.de.

We look forward to receiving your online application by 14 January 2025 under Ref. No. 24-258-4B. Please send us all the documents relating to your application comprising your CV, the relevant certificates and a letter of motivation that clearly shows your interest in this position. Unfortunately, we cannot accept applications sent via email.