

The Institut of Quantum Optics invites applications for **three positions** of a

## **Research Assistant (m/f/d) in the field of Experimental Physics (Salary Scale 13 TV-L, 75 %)**

starting as soon as possible. The positions are initially limited to 3 years each and offer the possibility of receiving a doctorate.

### **Responsibilities and duties**

#### *1) Roadmap to a microtechnological quantum gravimeter*

Analogous to the Laser in the field of optical interferometry, the use of Bose-Einstein condensates (BEC) represents a decisive advantage for atomic interferometry. Important methods in this field have been developed in our group and laboratory-filling setups have been transferred into transportable systems using the atom chip technology. Similar to the development of MEMS sensors (Micro-electro-mechanical systems), atom interferometers can be further miniaturized by utilizing microproduction technologies.

In interdisciplinary collaboration with engineers and industry, a quantum optical sensor based on cold or ultra-cold atoms shall be miniaturized and simplified using nanostructures. First studies on the micro-quantum system will be carried out with the collaborative partners and its performance should be evaluated for the use as an inertial sensor.

The tasks include electromagnetic computer simulations in the design phase, independent planning and construction of electrical and optical systems, and the planning, execution and evaluation of quantum optical experiments.

#### *2) Methods for miniaturized quantum sensors*

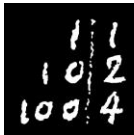
The miniaturization of quantum systems into smaller and smaller volumes requires the use of novel methods in atom interferometry to maintain the sensitivity of the sensor. As an alternative to simple freefall, atoms can be "juggled" in optical lattices or held in a guided trap instead. The basic feasibility of these methods has already been demonstrated in the group.

The project will investigate these methods in more detail and use them to realize a miniaturized, transportable quantum sensor that will be fabricated in collaboration with engineers in a partner project. The product will serve as a prototype for a transportable and compact atom chip fountain gravimeter.

Concrete tasks include the independent planning, construction and characterization of a compact and transportable laser system with regard to its use in atom interferometry as well as the planning, execution and evaluation of quantum optical experiments.

#### *3) Absolute Quantum Gravimetry in Flight (PI: Dr. Dennis Schlippert)*

The successful candidate will independently work on the realization of a quantum gravimeter for operation on aircraft in the frame of the "Leuchtturmprojekt AeroQGrav – Absolute Aero Quantengravimetrie". Work will be conducted in close collaboration with project partners at DLR-SI and geo++ GmbH and is particularly focused on the conception and setup of sensor periphery and integration of auxiliary sensors, mainly for suppressing the influence of vibrational noise, and the sensor's electronics system. Furthermore, the candidate will be involved in the commissioning and testing of the sensor including flight campaigns.



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### **Employment conditions**

To qualify for the position, applicants must hold a scientific university degree (Master, Diploma, or equivalent) in physics, photonics, quantum engineering, or comparable curricula. Very good knowledge of quantum optics and atomic and molecular physics is beneficial. We require very good written and spoken English, organizational skills, own initiative, and the ability and willingness to familiarize oneself with new areas of work.

### **What we offer**

Our research is closely embedded in numerous international and national collaborations, including the Collaborative Research Centers TerraQ and DQ-mat, the Cluster of Excellence QuantumFrontiers, the Quantum Valley Lower Saxony (QVLS), and close cooperation with DLR-SI. Through our collaboration with the QUEST Leibniz Research School and the Cluster of Excellence QuantumFrontiers, we offer outstanding development opportunities, actively support scientific staff on their way to a doctorate, and support them when research challenges arise. In our friendly and international working environment, you will take on projects independently and benefit from a top-class international network. Our integrated graduate school offers a wide range of continuing education opportunities in our interdisciplinary research field as well as training in soft skills to successfully prepare you for your career.

The university aims to promote equality between women and men. For this purpose, the university strives to reduce under-representation in areas where a certain gender is under-represented. Women are under-represented in the salary scale of the advertised position. Therefore, qualified women are encouraged to apply. Moreover, we welcome applications from qualified men. Preference will be given to equally-qualified applicants with disabilities.

For further information, please contact Dr. Dennis Schlippert (Phone: 0511 762-17959, Email: [schlippert@iqo.uni-hannover.de](mailto:schlippert@iqo.uni-hannover.de)).

Please submit your application including

- Letter of motivation incl. brief summary of your research interests & previous experience (max. 2 pages)
- Curriculum Vitae
- Transcripts
- if applicable, your preference for one or more of the three offered projects

until October 13th, 2023 in electronic form using the **subject "IQO-2023-09"** to

Email: [schlippert@iqo.uni-hannover.de](mailto:schlippert@iqo.uni-hannover.de)

or alternatively via postal mail to:

**Gottfried Wilhelm Leibniz Universität Hannover**

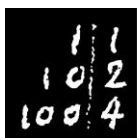
Institute of Quantum Optics

Dr. Dennis Schlippert

Welfengarten 1, 30167 Hannover

GERMANY

<http://www.uni-hannover.de/jobs>



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Only those applications that are complete with respect to the above list will be considered. Applications that are submitted after the deadline above might in addition be taken into account until the position is filled.

Information on the collection of personal data according to article 13 GDPR can be found at <https://www.uni-hannover.de/en/datenschutzhinweis-bewerbungen/>.