

**Position and research project (11):**

Research Associate / Ph.D. student (75% TV-L E13 | employment till 31.12.2026)

**A novel, fiber-based hybrid quantum system**

This position is part of a new research project on quantum optomechanics in the Fundamentals of Optics and Photonics group at the Humboldt-Universität zu Berlin. Specifically, we aim to achieve ground-state cooling of the mechanical motion of a tapered optical nanofiber with the goal of engineering an interaction of this motion with cold atoms trapped in the near field of the fiber. This would enable an interesting new hybrid quantum system for fundamental tests of quantum mechanics.

**Tasks:**

- Characterization and optimization of the mechanical damping rate of a nanofiber
- Characterization and optimization of the optomechanical coupling mechanism
- Absolute temperature measurement using sideband spectroscopy
- Construction of a new, potentially cryogenic vacuum chamber
- Analysis of fiber properties in the presence of thermal alkali vapours
- Perform analytical calculations and numerical simulations to support the experimental work
- Work closely with postdoctoral fellows, Ph.D. and Masters students
- Present research results in international journals and at conferences

**Scientific and technical competences:**

## Essential:

- Master's degree in physics (or in related fields with appropriate specialization)
- Good English skills; willingness to acquire the missing language skills
- Solid knowledge of the physics of driven dissipative oscillators

## Desired:

- Practical experience with high vacuum systems and handling tapered optical fibers
- Experience with laser systems for optical measurements and precision polarimetry
- Data acquisition and data processing skills, ideally using Python
- General laboratory skills (especially: optics, opto-mechanics, opto-electronics, RF-electronics)

**Employment:**

Humboldt-Universität zu Berlin  
Mathematisch-Naturwissenschaftliche Fakultät  
Institut für Physik  
Berlin, Germany

**Application (11) to:**

Prof. Arno Rauschenbeutel  
Humboldt-Universität zu Berlin  
Institut für Physik  
Newtonstraße 15  
12489 Berlin  
[fedoua.rothlaender@hu-berlin.de](mailto:fedoua.rothlaender@hu-berlin.de)

Your application must include a curriculum vita, copies of certificates and documents, a detailed description of your past or current research projects, a list of publications, a recommendation letter and a motivation letter as well as the contact information of two references.

HU is seeking to increase the proportion of women in research and teaching, and specifically encourages qualified female scholars to apply. Severely disabled applicants with equivalent qualifications will be given preferential consideration. People with an immigration background are specifically encouraged to apply. Since we will not return your documents, please submit copies in the application only.