Freie Universität Berlin - Department of Physics

Who We Are Are you passionate about cutting-edge fundamental research on molecular and 2D materials heterostructures? Are you looking to pursue your PhD in an excellent, interdisciplinary research environment at a leading German university? If so, we invite you to apply! The newly established Collaborative Research Center CRC 1772 "mol2Dmat" investigates novel collective states and quantum phenomena in heterostructures of molecules and two-dimensional materials. Our interdisciplinary consortium brings together 20 research groups from Freie Universität Berlin, Humboldt-Universität zu Berlin, Technische Universität Berlin, and the Max Planck Institute in Hamburg. Our work combines physics, chemistry, and materials science – pushing the frontiers of quantum materials research. The overarching goal of the Collaborative Research Center (CRC) 1772 is to explore and harness previously inaccessible collective phenomena and ground states in heterostructures of molecules and two-dimensional materials. Two-dimensional (2D) materials are atomically thin crystals that may be stacked into heterostructures with new and totally unexpected properties. CRC 1772 takes this to the next level by creating and studying heterostructures of organic and inorganic molecules encapsulated inside 2D materials. The Bolotin research group in the Physics Department of the Free University Berlin specializes in nanoscale electronics and optoelectronics of two-dimensional materials and heterostructures. Our focus is to find new ways to manipulate these materials to build systems with designer Hamiltonians – and enable new quantum technologies. Our main experimental tools include nanofabrication, electrical transport measurements, static and time-resolved optoelectronic measurements. Our unique strengths are platforms for nanomechanical manipulation, approaches to reach high carrier densities and electric fields, and techniques to control 2D moirés in situ.

Research assistant (praedoc) (f/m/d) (DM-PHY-990)

Department: Department of Physics contract duration: limited until 30.06.2029 Salary / pay grade: E 13 TV-L FU Working hours: 75 % Requisition ID: 990 Application deadline: 07.12.2026

City: Berlin; Starting date (earliest): At the earliest possible; Duration: limited until 30.06.2029; Remuneration: E 13 TV-L FU; Reference number: 990; Closing date: 07/12/26

Tasks

What You Can Expect in Your New Role

You will be working on sub-project B01 as part of the Collaborative Research Centre ‘Heterostructures from Molecules and 2D Materials’. In that center, experimental and theoretical research groups from physics and chemistry collaborate to develop a new type of matter – organic molecules interfaced with two-dimensional material.

Within the Bolotin research group, your project will be to explore a new type of excitons – interlayer hybrid excitons -- in the molecule/2D heterostructures. The objectives will be:

- Fabricate hybrid structures and integrate them with field-effect transistor geometry
- Prove the interlayer character of the excitons via field-effect transistor

measurements, and explore inter-excitonic coupling
- Drive system toward the regime of excitonic condensation and explore the regime of excitonic coherence – potentially culminating in the elusive Excitonic Insulator state.

Additional benefits:

- Work in one of the most active research fields with a flourishing international community, in Berlin, one of the most vibrant cities in the world.
- Broad support through the Research Center graduate school programs.
- Rich infrastructure: top nanofabrication, spectroscopy, and microscopy facilities.

Requirements

Key Requirements

Completed university degree (Master's) in physics or a closely related subject.

Desirable

- Hands-on experience with 2D materials, nanofabrication approaches (e.g., lithographies, microscopies)
- Chemical techniques and experience with organic chemistry (desired)
- Building and developing an experimental setup from scratch
- Numerical simulations and computer programming (e.g., Python and LabVIEW)
- Developing back-of-the-envelope estimates for complex physical problems.

What we offer

Benefits and Other Advantages

- Salary in line with the collective agreement for the civil service at the state level (TV-L FU), plus additional one-off annual payment
- Flextime with proportional allowance of days for working from home
- Good work-life balance thanks to flexible working hours makes family and care responsibilities easier to manage
- Thirty days of vacation (based on a five-day working week)
- Office closed on December 24 and December 31
- Numerous training and continuing education options for professional and personal development
- Opportunity to participate in University Sports Center courses and the health promotion program

Application

If you are interested in what we have to offer,

We look forward to receiving your detailed application, which should include: a cover letter, your tabular CV, and your certificates (BSc, MSc) and transcripts. Please explain why your academic and scientific expertise has prepared you for this research project.

Please send us your application via our online recruiting portal by clicking on the “Apply now” button. From there, you will be redirected to create a profile. This is only necessary for first-time applicants.

Further information is available from Prof. Bolotin (+49 030 838 50900).

Please note

Freie Universität Berlin is an equal opportunity employer.

Closing date: 07/12/26
Reference number: 990
Contact person: Prof. Bolotin

By internet: https://jobs.fu-berlin.de/job/Research-assistant-%28praedoc%29-%28fmd%29-%28DM-PHY-990%29/1456302433/

More information at https://stellenticket.de/208818/BUA/
Offer visible until 07/12/26