

The Leibniz Institute for Solid State and Materials Research Dresden e. V. (IFW Dresden) conducts modern materials research on a scientific basis for the development of new and sustainable materials and technologies. The institute employs an average of 500 people from over 40 nations and, in addition to its scientific tasks, is dedicated to promoting young scientists and engineers. Further information at: <http://www.ifw-dresden.de>

The Institute for Metallic Materials (Prof. K. Nielsch) of the IFW Dresden offers a

## Doctoral Researcher Position (m/f/d)

### *Realizing superconducting circuits using van der Waals superconductors and twisted hetero-structures*

on a part-time basis with a weekly working time of 28 hours, starting from January 2024.

#### **Project description:**

Superconducting quantum circuits are one of the leading candidates for quantum hardware. The properties of these quantum circuits can be tuned by changing the geometry and position of the circuit elements. Although most of these circuits are done using single element superconducting metals like Nb or Al, it is now known that quantum complexity is emerging in a wide variety of so-called van der Waals materials. Their incredible electronic and mechanical properties can be integrated in quantum circuits for realizing a new generation of electronic device harnessing quantum complexity for their functionality. Moreover, Van der Waals (VdW) heterostructures formed by mechanically stacking layers of 2-Dimensional (2D) superconductors possess unique properties and new functionalities, not seen in standard materials, that make them irreplaceable platform for emergent superconducting electronics. In this project, we will use quantum circuits to probe and control the van der Waals superconductors and we will develop technologies for their engineering and manipulation. The PhD candidate (m/f/d) research goal will be to develop experimental methodologies and a theoretical understanding of novel quantum circuits using van der Waals superconductors. The student (m/f/d) will therefore learn advanced nanofabrication techniques and quantum electronic transport techniques in a joint effort with the nearby Max Planck Institute and the group of Uri Vool.

#### **Your profile:**

We are looking for a highly motivated and team-oriented student (m/f/d), who holds a Master degree in physics, nanoscience. Basic knowledge in nanofabrication and condensed matter physics is welcome. The successful candidate (m/f/d) is enthusiast about fundamental science, highly ambitious and able to establish collaborations. Good communication skills in written and spoken English are required.

#### **Conditions:**

Remuneration is based on the TV-L (EG 13, 70 %). The first contract is limited to 1 year, an extension for another 2 years is possible. Doctoral students (m/f/d) are facilitated to participate in the doctoral program in order to successfully complete their dissertation. We offer an attractive workplace with excellent facilities and surroundings in Dresden.

IFW Dresden strives for a balanced gender ratio in all areas. In science, IFW Dresden would like to increase the proportion of women and therefore explicitly invites suitably qualified female scientists to apply. The application of severely disabled persons is explicitly welcome.

Application including a CV, a motivation letter describing the research career goals, skills and experience, copies of all certificates should be sent citing the reference number **041-23-2107** no later than **September 30th, 2023** online as a single pdf-file to:

[bewerbung@ifw-dresden.de](mailto:bewerbung@ifw-dresden.de).

For further information, please contact: Dr. Nicola Poccia ([n.poccia@ifw-dresden.de](mailto:n.poccia@ifw-dresden.de)).  
Research group website: <https://superpuddles-lab.ifw-dresden.de/>

