



PhD Program between the Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

**Open PhD Position at Freie Universität Berlin,
offered only to Chinese CSC scholarship candidates 2019**

Please Note: this PhD position is only offered to Chinese PhD candidates for the application in the framework of the FUB-CSC PhD Program.

<u>Department/Institute:</u>	Physics
<u>Subject Area:</u>	Nanoscale Transport/Optoelectronics
<u>Name of Supervisor:</u>	Kirill Bolotin
<u>Number of Open PhD Positions:</u>	1
<u>Type of the PhD Study:</u>	Full-time
<u>Project Title:</u>	Ultrafast Optospintronics in Two-Dimensional Semiconductors

PhD Project Description:

Monolayer transition metal dichalcogenides (TMDs) are semiconducting materials that are only three atoms thin. These materials are currently at the forefront of condensed matter physics research because of their strong many-body and excitonic effects, unusual bandstructure, and sensitivity to external stimuli. TMDs are especially interesting for potential applications in ultrafast spintronics. The advantages include the possibility of optical manipulation of spin/valley degrees of freedom and facile tunability of spin properties via surface modification. Therefore, the main goal of this project is to investigate ultrafast spin dynamics in TMDs and at the interface between TMDs and metals. This, in turn, should pave the way towards TMD-based devices that use spin and other degrees of freedom as information carriers.

During the project, you will work in an active international team that is a part of a big research cluster (TRR) devoted to the study of ultrafast spin dynamics in advanced materials. Your main goal will be to develop new photocurrent-based techniques for studying the ultrafast dynamics of spin/pseudospin in TMDs and to discover new phenomena using that technique. You will carry out device nanofabrication, two-dimensional materials growth and transfer, participate in development of a new ultrafast photocurrent setup. The project combines the techniques from laser physics, ultrafast optics, electrical transport and nanoscience.

Language Requirements:

Only English is required:
IELTS: 6,5 / TOEFL: 95 ibt

Academic Requirements:

Masters in Physics, Applied Physics or Nanoscience.

Information of the Professor or Research Group Leader:

The Bolotin lab (bolotingroup.com) specializes in quantum electronics and optoelectronics of two-dimensional materials. The key experimental techniques are electrical transport, strain engineering, photocurrent spectroscopy, and state-of-art nanofabrication. The group strives to understand fundamental quantum mechanical behaviors of these materials as well as to find their new applications. The group is funded by prestigious grants from European Research Council, German Science Foundation (DFG), as well as by American funding agencies.

Please Note: In a first step, the complete application should be submitted to the Beijing Office for evaluation by January 4th, 2019. Please do not contact the professor before. He/she will get in contact with you after having received the complete application via the Beijing Office in January.