



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 Department
<u>Subject Area:</u>	Nanomaterials Science
<u>Name of Supervisor:</u>	S. Reich/ A. Setaro/ M. Adeli
<u>Number of Open PhD Positions:</u>	1
<u>Type of the PhD Study:</u>	Full-time
<u>Project Title:</u>	Bridging Nano-Optics to the Macroscopic World

PhD Project Description:

When going down to the nanometric level, reduced dimensionality and confinement make materials exhibit quantum properties not accessible in their macroscopic bulk form. For example, excitonic effects in bulk material require working at cryogenic temperatures. The suppression of screening in one or more dimensions stabilize the excitons in low-dimensional materials at room temperature and make them rule their optical response. The distinctive optical features of carbon nanotubes stem from their strongly bound, stable excitons. They are extremely sensitive and get lost as soon as nanotubes bundle together or lose their conjugation.

Scope of this research project will be the upscaling of the quantum properties of nanomaterials to make them available at the macroscopic level in standard environmental conditions. Pursuing a novel pi-preserving covalent functionalization strategy we recently developed [1], the successful candidate will develop an assembly strategy to bring together the building nanotubes units into a macroscopic structure while preventing the loss of their quantum signature. After the rational synthesis of the meta-structures, the candidate will investigate and characterize their optoelectronic response.

[1] Nat. Comm. **8**, 14281 (2017).

Language Requirements:

IELTS: 6,5 / TOEFL: 95 ibt

Academic Requirements:

The candidates should possess a Master Degree in Chemistry, Material Science, or Physics. We will evaluate applications from various subfields. Highly desired is proven experience in one or more of the following areas: Synthetic chemistry, physical chemistry, science and chemistry of carbon-based nanomaterials, optical and Raman spectroscopy on nanostructures.

Information of the Professor or Research Group Leader:

<http://www.physik.fu-berlin.de/en/einrichtungen/ag/ag-reich/index.html>

Prof. Dr. Stephanie Reich is a leading expert in the field of carbon-based nanostructures like carbon nanotubes and graphene. She studies the fundamental optical, electronic, and vibrational properties of carbon nanosystems using optical spectroscopy and Raman scattering including tip- and surface enhanced Raman scattering. She showed how carbon nanostructures are selectively addressed using hyperspectral Raman scattering and how to use surface-enhanced Raman scattering to detect individual nanoscale structures with excitation energies away from their intrinsic resonances. More recently, she focused on functionalizing carbon nanostructures with molecules to tailor their properties for specific application. Prof. Reich holds the chair in experimental solid state physics at Freie Universität Berlin. She published more than 150 research articles in international journals and a textbook on carbon nanotubes; she is the organizer of the Kirchberg Winter school and Diamond and Carbon Materials, two leading conferences in the field.

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.