



Institute of Physics of the Polish Academy of Sciences

Scholarship for a PhD Student



Job ID: # JOB 25/2021

Job Description

Job Title: PhD student – scholarship holder

Job Summary:

Non-toxic quantum dots for solar energy harvesting (experimental)

Job Description:

Quickly rising global energy consumption contributes to economical and environmental insecurity experienced worldwide. Energy production from light radiated from the sun is one of the solutions capable of meeting the long term increase in demand. However, the contribution of photovoltaic sources to present day energy production is still limited due to relatively high cost. It is therefore necessary to decrease the production costs of solar cells (SCs) and/or increase their efficiencies.

The main source of losses in energy generation from the sun is the so called **spectral mismatch**: photons with energy much higher than SC absorber band gap are lost to heat and photons with lower energy are not absorbed at all. In this project, we will work to overcome the spectral mismatch by **adapting the solar spectrum** via energy conversion and transfer. To this end, we will design, fabricate, and engineer non-toxic quantum dots (QDs) based on group I-III-VI₂ compounds (e.g., CuInS₂). We will perform state of the art spectroscopic studies of these materials to **understand energy relaxation pathways** of electrons created by light absorption. The results of these studies will inform the **design of target nanostructures**, which will be employed in prototypical devices.

The successful candidate will take part in colloidal **synthesis** of the I-III-VI₂ QDs and will use the tools of **ultrafast spectroscopy** such as time-resolved photoluminescence and transient absorption. These studies will be performed in the range of temperatures between 2 and 300 K and in magnetic fields up to 70 T via **collaborations** with the University of Warsaw, Poland and National High Magnetic Field Laboratory in Toulouse, France. The successful candidate will join a young group of researchers working on various nanostructure systems with a view of applications ranging from optoelectronics to nanomedicine.

Requirements:

- Master's degree (or equivalent) in physics, chemistry, or a related field
- Experience with optical spectroscopy
- Experience with data analysis tools
- Proficiency in English

- Excellent team work
- To be employed, the candidate must be accepted into the PhD school in which the Institute of Physics participates. Applications for the position are through recruitment to the School, online at warsaw4phd.eu.

Main research field: Physics

Sub Research Field: chemical physics

Career Stage: Early stage researcher or 0-4 yrs (Post-graduate)

Research Profile ([details](#)): First Stage Researcher (R1)

Type of Contract: Fixed term (36 months)

Status: Full-time

Salary: grant funding of **4000** PLN per month, before subtracting obligatory employer and employee social security contributions (~15%).

Contact

More information can be obtained from

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<http://klopotoski.com/physics>

Application details

Application deadline: 06.06.2021 Later applications will not be considered.

Required materials:

- Scientific CV
- Cover letter
- Scan of MsC diploma or equivalent (or an explanation of when one is expected)
- Academic record (for finalized semesters)
- Recommended: A recommendation letter by an academic, or their contact email.

All materials should be submitted in electronic form by application to the PhD school warsaw4phd.eu, choosing the project: "*4.8. Non-toxic quantum dots for solar energy harvesting (experimental)*". The application system will be active from 24 May 2021. Results regarding the position will be made available by 12 July 2021.