

**Job ID: #JOB 7/2021**

## **Job Description**

**Job Title: Post-doc Quantitative Electron Microscopy**

**Job Summary:**

Quantitative In-operando Transmission Electron Microscopy of hybrid-nanowires based on numerical modeling.

**Job Description:**

The Post-Doc will be involved in research in the frame of the OPUS project “In-operando electron microscopy investigations of properties and structural stability of the nanowires with piezoelectric core and magnetostricted shells”. The aim of the Post-Doc work will be numerical analysis of the processes occurred at the interphases boundaries in hybrid objects such as core-shell nanowires, where the ratio of surface area and boundaries to volume is high and the anisotropy of the physical properties of the monocrystalline core determines the properties of such hybrid. The investigation will be based on the data obtained in in-operando experiments carried out in the transmission electron microscope with single nanowires mounted on MEMS (Micro-Electro-Mechanical-System) chip miniature test stand. As a result, the reactions to external forces caused by electrical polarization, mechanical stresses and magnetic fields exerted on the hybrid nanowires inside the magnetic lens of the transmission electron microscope will be studied.

The main problem to solve will be the dynamics of the ongoing modification of the lattice distortions 3D fields and defects nucleation, which conduct to structural degradation and finally determine their kinetic parameters. In particular, Post-doc's task will be to develop a numerical structural model of a single hetero-nanowire. The Finite Element Method, Monte Carlo and other simulation methods for solids will be applied to study reciprocal interaction of core and shell at atomic and nanometric scales. Such structural model will be used to compute the electron microscopy images (HRTEM, electron holograms, STEM and electron diffraction patterns). Theoretical predictions will be compared with experimental data (in real time and offline). The work will be performed on regular base with close collaboration with Phd student and other member of the Project team.

**Main research field:** Physics

**Sub Research Field:** solid state physics, transmission electron microscopy

**Career Stage:** Recognized researchers (R2)

**Research Profile** ([details](#)): **Recognized Researcher(R2)**

**Requirements:**

- PhD degree obtained after 1 January 2015 in one of the following domain: solid state physics, material science, computational physics, mechanic of solids, electronics, nanotechnology;
- (co)author of scientific publications in international journals related to advanced transmission electron microscopy, application of the finite elements methods or molecular dynamic for crystal lattice strain calculation of nano- heterostructures, plastic relaxation of crystals,
- ability to work in a team,

- good spoken and written English.
- knowledge of specialized software as: Comsol Multiphysics, QSTEM, JEMS, uSTEM , Digital Micrograph at scripting level will be an additional advantage
- good skills in at least one programming language, e.g.. Python or C++
- possibility to starting work at the seat of the Institute of Physics of the Polish Academy of Sciences in Warsaw within 36 days from the date of announcement of the competition results. If the candidate does not appear in person within this period, we reserve the right to cancel the competition.

**Type of Contract:** temporary 2 years

**Status:** full time

**Salary:** 10 000 PLN per month (before taxes, including obligatory taxes paid by employer)

## Contact

More information can be obtained from Sławomir Kret (e-mail: [kret@ifpan.edu.pl](mailto:kret@ifpan.edu.pl)).

## Application details

**Application deadline:** 22.02.2021. Later applications will be not considered.

### Required materials:

- Curriculum Vitae
- List of publications
- Motivation letter
- Copy of PhD diploma
- Contact (e-mail) addresses of at least two researchers familiar with the candidate's achievements.
- Consent to process your personal data (expressed on the form attached to this announcement)

All materials should be submitted in electronic form to the address: [jobs@ifpan.edu.pl](mailto:jobs@ifpan.edu.pl) with Job ID in the subject.

### Information clause in the process of recruitment for studies

Under Art. 13 sections 1 and 2 of the Regulation of the European Parliament and of the Council (EU) 2016/679 of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Resolution), EU OJ L 119 of 04.05.2016, page 1, as amended, hereinafter referred to as "GDPR", we hereby inform as follows:

1. The Data Controller, i.e. the entity deciding how your personal data are used, is the Institute of Physics of the Polish Academy of Sciences, represented by the Director, with its registered office in Warsaw Al. Lotników 32/46. You can contact the Data Controller using one of the contact forms available at: phone (22) 116-2111, e-mail [director@ifpan.edu.pl](mailto:director@ifpan.edu.pl).
2. The Director of the Institute of Physics of the Polish Academy of Sciences has appointed a Data Protection Officer (DPO) with whom you may contact in matters regarding your personal data. You may contact the Officer sending an e-mail to: [iodo@ifpan.edu.pl](mailto:iodo@ifpan.edu.pl)
3. Your personal data shall be processed in order to perform the process of recruitment for studies;
4. The basis for processing of your personal data are provisions of the Act on Higher Schools and Education (consolidated text: Journal of Laws of 2018, item 1668);
5. Your personal data shall be processed for the period of 6 months upon completion of the recruitment process and in case of admission to studies, according to the course of the studies, and then they shall be archived according to the applicable provisions;
6. Your personal data shall not be made available to any other entities save for entities authorised under the provisions of the law. Employees and members of the university recruitment committees authorised by the Data Controller will have access to your personal data;
7. Providing personal data by you is voluntary, but failure to provide them precludes participation in the recruitment process;
8. You have the right to access the contents of your personal data and you have the right to rectify them, erase them and restrict their processing;
9. You can submit a complaint to the Inspector General for the Protection of Personal Data if you find that their processing violates provisions of the General Data Protection Regulation.

**Consent for processing:**

I grant my consent for processing of my personal data by the Institute of Physics of the Polish Academy of Sciences in order to ensure conditions of full participation in the process of recruitment for studies. I provide the personal data voluntarily and declare that they are true. I have familiarised myself with the content of the information clause, including the information about the purpose and methods of processing of personal data and right to access the content of my data and the right to rectify them.

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Date, candidate's signature