



# Institute of Physics of the Polish Academy of Sciences

## Scholarship for a PhD Student



Job ID: #JOB7/2023

### Job Description

**Job Title:** PhD student

**Job Summary:** Analytical and numerical study of topological insulators (semiconductors)

**Job Description:** The student will join the group under the supervision of dr hab. Wojciech Brzezicki, working on the NCN funded project “Limitations for Protected Transport and Exotic Topological States in Topological Semiconductors”. In this project we will address four critical questions related to topological semiconductors:

(A) Lack of topological protection in HgTe/CdTe-type quantum wells. We will model transport in disordered topological multilayers and our aim is to show that the additional edge modes can be responsible for the lack of topological protection.

(B) Study of symmetry-protected topological invariants and symmetry-broken states for multilayer semiconductors, involving surface atomic steps and nanowires.

(C) Control of topological invariants, design of systems that exhibit QSH effect at a macroscopic scale. We will search for such a design of a quantum well that the additional edge modes are either absent or moved out of the gap.

(D) Non-hermitian topological systems, multilayer semiconductors in microcavities and beyond. Going beyond means implementing non-Hermitian Hamiltonians with non-trivial topology using chains of superconducting or optomechanical circuits.

Collaboration with the experimental groups at MagTop/IFPAN,  
<http://www.magtop.ifpan.edu.pl>

#### Requirements:

- Sufficient proficiency in English
- Experience in programming (Mathematica/MatLab/Python or similar)
- Experience in the theory of condensed matter systems and topological matter
- Published at least one paper in peer-reviewed journal in the topics of topological crystalline insulators

**Main research field:** Physics

**Sub Research Field:** Condensed Matter – Topological states of matter

**Career Stage:** Early stage researcher (with MSc diploma)

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

**Type of Contract:** Fixed term (10 months)

**Status:** Full time

**Salary:** 5000 PLN per month (untaxed scholarship).

### Contact

More information can be obtained from

Wojciech Brzezicki (e-mail: [brzezicki@MagTop.ifpan.edu.pl](mailto:brzezicki@MagTop.ifpan.edu.pl) ).

## Application details

**Application deadline:** 16.02.2023. Later applications will be not considered.

**Required materials:**

- Scientific CV
- Cover letter
- Certificate that at the moment of application a candidate is a Master Degree student or a participant of a PhD study or a PhD student at Doctoral School in Poland.
- Written permission of the candidate's scientific supervisor together with his/her recommendation
- Consent to process your personal data

All materials should be submitted in electronic form to the address:

[rekrutacja@ifpan.edu.pl](mailto:rekrutacja@ifpan.edu.pl) with Job ID in the subject.

### Information clause – scholarship competition

Pursuant to Article 13 paragraphs 1 and 2 of Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of individuals 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 Regulation) Official Journal of the European Union, L 119, 4 May 2016, page 1, as amended, hereinafter referred to as “GDPR”, we hereby inform as follows:

1. The Institute of Physics of the Polish Academy of Sciences with its registered office in Warsaw, Al. Lotników 32/46, represented by its Director, is the Controller, i.e. an entity deciding about how your personal data will be used. You may contact the Controller using one of the contact forms available on the website: tel. (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 the Data Protection Officer (DPO), whom you may contact in matters relating to your personal data, by sending an email to the following address: [iodo@ifpan.edu.pl](mailto:iodo@ifpan.edu.pl)
3. Your personal data will be processed in connection with your participation in the scholarship competition and if you win the competition, in connection with receiving the scholarship – on the basis of your consent – Article 6 paragraph 1 item a GDPR.
4. Your personal data will be processed for a period of 6 months after the end of the scholarship competition and in the case of receiving the scholarship – for a period resulting from legal and tax regulations;
5. Your personal data will be made available to other entities that can finance and settle the scholarship granted and entities authorized under provisions of law. Your data will only be accessed by people authorized by the Controller;
6. Provision of your personal data is mandatory; in the event of failure to do so, you will not be able to participate in the scholarship competition;
7. You have the right to access your data, the right to rectify it and limit processing thereof;
8. You have the right to lodge a complaint to the President of the Office for Personal Data Protection, if you consider that the processing of your personal data violates provisions of the General Data Protection Regulation.

#### Consent to processing:

I hereby consent to the processing of my personal data contained in the application/request form by the Institute of Physics of the Polish Academy of Sciences to conduct the scholarship competition and in the case of being granted the scholarship, to pay and settle it. I provide my personal data voluntarily and I declare that it is accurate. I have read the content of the information clause.

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Date and signature