

Open PhD position within the Polonez Bis-1 programme

Title of the project: "Quantum impurity physics in imbalanced mixtures of ultracold quantum gases"

Principal investigator: Dr. Tomasz Wasak

Faculty: Nicolaus Copernicus University (www.umk.pl/en)

Faculty of Physics, Astronomy and Informatics (www.fizyka.umk.pl/en)

Institute of Physics (www.fizyka.umk.pl/en)

Toruń, Poland

Number of positions: 1

Duration of the scholarship: 23 months (possibility for extension, see below)

Starting date: 1. October 2022

Scholarship amount: 5000 PLN (approx. 1080 EUR) monthly

The scholarship is awarded in line with the rules contained in the Statue for scientific scholarships in research projects financed by the National Science Center and confirmed with the resolution nr. 25/2019 from the 14th of March 2019.

Tasks:

- Theoretical studies of interacting highly imbalanced mixtures of ultracold and cold quantum gases.
- Study of the effects of coupling the quantum systems to light.
- Performing numerical simulations and analyzing the data, preparation of manuscripts and figures.
- Visits to cooperating institutions.
- Participation in international conferences and workshops, presenting seminars.

The offer and conditions:

1. Maximum period of the stipend agreement: 23 months/month with the scholarship amount 5000 PLN/month (approx. 1080 EUR/month). The scholarship can be extended in case of being awarded a research grant. In case of admittance to Academia Copernicana Interdisciplinary Doctorate School in Toruń (www.ac.umk.pl, see "Requirements" below) the remaining period of the 4-year doctoral studies can be covered by the Nicolaus Copernicus University at the level of standard stipend of the Doctoral School.
2. Opportunity to work in the interdisciplinary research department with strong support from the physics groups within the department. The Institute has unique expertise in the fields: cold matter physics, solid-state physics, light-matter interactions, open systems, quantum information.
3. Collaboration with international research groups in the field of cold and ultracold quantum systems.
4. International internships and the possibility to present research results at international conferences.

Requirements:

1. The candidate should hold a status of a PhD student in Poland before the starting date of the scholarship. There is a possibility of enrollment in a 4-year studies programme at Academia

Copernicana Interdisciplinary Doctorate School in Toruń: www.ac.umk.pl with opening on 31st August 2022 and the **deadline**: 8th September 2022 at 2:00 p.m. CEST.

2. Strong background in quantum mechanics and quantum optics, atomic physics or statistical mechanics. The knowledge of many-body quantum mechanics (Green's function formalism) or atom-light interactions would be appreciated.
3. Good programming skills in Mathematica and/or other programming languages like C++, Python or Julia; good skills in LaTeX.
4. Good command of English in writing and speaking, allowing for collaboration, reading specialized literature, scientific discussions and presentation of research results.
5. Analytic skills and problem-solving attitude.
6. Curiosity and motivation to state scientific questions.
7. Ability to work independently and as part of a team.

Application must include:

1. Motivation letter.
2. CV including: past scientific activities, achievements, awards, description of scientific interests
3. List of publications and/or list of conferences in which the candidate participated; in case of the conference list, please append a digital version of the posters or the presentations.
4. Copy of awarded degree certificates if available or expected date of MSc defense.
5. Copy of the Master thesis (final or the most up-to-date version).
6. Copy of a list of completed courses with final grades.
7. Contact details for a reference letter (at least one, preferably to the Master thesis supervisor).

Application deadline: 18th September 2022

Application method: by e-mail to: twasak@umk.pl

Additional information:

1. The candidates will be individually informed about the date of the interview, which may be conducted in person or online. The recruitment procedure should be finalized by: 30th September 2022.
2. For additional information please contact Tomasz Wasak at twasak@umk.pl. In case the accepted candidate resigns from the scholarship, the commission might choose the next candidate from the ranking list.
3. Please include in your offer the following statement:
"I hereby give consent for my personal data included in my application to be processed for the purposes of the recruitment process under the Personal Data Protection Act as of 10 May 2018 (consolidated text: Journal of Laws 2019, item 1781) and pursuant to art. 6 § 1a GDPR (General Data Protection Regulation - EU 2016/279)."
4. The research is part of the project No. 2021/43/P/ST2/02911 co-funded by the National Science Centre in Poland and the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement no. 945339.