 

# **ADAM MICKIEWICZ UNIVERSITY, POZNAN**

**ANNOUNCES**

**A COMPETITION**

**for the position of Postdoctoral Researcher**

**at the Faculty of Physics**

**in project: *‘Time and momentum-resolved studies of gigahertz acoustic phonons in acoustoplasmonic metamaterials.’.***

**with project number: UMO-2021/43/D/ST3/02526**

**Basic information**

1. **Research discipline (research field):**

Physics

1. **Number of work hours per week including a task-based work schedule (if applicable):**

Full-time, 40 hours per week in a task-based work time system.

1. **Type of an employment contract and expected duration of employment,**

Fixed-term contract for **2 years** with possible extension for **1 year** (max. total 3 years).

1. **Anticipated job starting date:**

01.02.2023.

1. **Salary:**

Gros approx. 7 800 PLN/month brutto

1. **Workplace location:**

Faculty of Physics, Uniwersytetu Poznanskiego 2, 61-614 Poznan.

1. **Application deadline and process:**

Electronic submission to [thovas@amu.edu.pl](mailto:thovas@amu.edu.pl). Application deadline: **20.12.2022**. Please note that the job reference number should be quoted in the application.

1. **Required documents**

* Application form/letter of the candidate (email);
* *Curriculum Vitae* (max. 5 pages A4);
* Diplomas or certificates issued by colleges and universities attesting to education and degrees or titles held (in case of academic degrees obtained abroad - the documents must meet the equivalence criteria set out in Article 328 of the Act of 20 July 2018 Law on Higher Education and Science (Journal of Laws of 2022, item 574 i.e. as amended; Polish: Dz.U. z 2022 r. poz. 574 z późn. zmianami);
* Candidates who do not yet have a doctoral degree may apply if they plan to obtain it by the date of signing the employment contract.
* Information on the Applicant's research (publication record and list of conferences attended), teaching and organizational achievements,
* Two reference letters (not older than 3 months).
* Consent to the processing of personal data as follows: *In accordance with Article 6 (1) (a) of the General Data Protection Regulation of 27 April 2016. (OJ EU L 119/1 of 4 May 2016) I consent to the processing of personal data other than: first name, (first names) and surname; parents' first names; date of birth; place of residence (mailing address); education; previous employment history, included in my job offer for the purpose of the current recruitment.";*

**Conditions of the competition determined by the competition** **committee**

1. **Determination of qualifications: (researcher profile) according to the Euraxess guidelines**

**(R2)** **Recognised Researcher** (PhD holders or equivalent who are not yet fully independent)

(definition of qualification level and professional experience according to Euraxess guidelines https://euraxess.ec.europa.eu/europe/career-development/training-researchers/research-profiles-descriptors)

1. **Job Offer description**

The job offer refers to the position in the NCN SONATA project (National Science Center) titled *Time and momentum-resolved studies of gigahertz acoustic phonons in acoustoplasmonic metamaterials* (Contract number: UMO-2021/43/D/ST3/02526).

The artificial, nano-engineered materials that synergistically merge plasmons and acoustic phonons are termed acoustoplasmonic metamaterials. A major obstacle for plasmonics and signal-processing devices is excessive heat generation. Ideally, the plasmonic resonances and the phononic band-structures in acoustoplasmonic metamaterials are engineered such that they maximize the energy transfer from plasmons into selected modes of acoustic phonons. In this way, most of the energy input will transform into useful acoustic signals, instead of waste heat. To achieve this selective energy transfer, our project aim is to perform time and momentum-resolved studies of photoexcited acoustic phonons in acoustoplasmonic metamaterials. The main experimental technique will be Brillouin Light Scattering (BLS) combined with femtosecond laser excitation of coherent acoustic phonons, termed pumped-BLS, and time-resolved electronics to capture nanosecond (ns) and sub-ns dynamics.

Based on the state of the art and preliminary results, we want to verify the following research hypotheses: (h1) Plasmons can enhance the signal of BLS in both equilibrium conditions, as in surface-enhanced Raman spectroscopy (SERS), and in non-equilibrium, photoexcited states. (h2) Energy transfer from plasmons to acoustic phonons occurs at specific parts of the phononic band-structure due to symmetry rules. (h3) The preferentially excited Lamb waves will decay into other modes with anharmonic phonon-phonon coupling during the first few nanoseconds after photoexcitation. To verify the above, we will (1) design and fabricate semiconducting nanomembranes hosting high-frequency acoustic phonons, with surface-decoration of ordered / crystalline arrays of plasmonic nanostructures, (2) perform momentum-resolved, band-structure-mapping of acoustic phonons with angle-resolved micro-Brillouin light scattering (μ-BLS) measurements, (3) combine μ-BLS with femtosecond laser pulses and a Time-Correlated Single Photon Counting (TCSPC) system for time-resolved band-structure-mapping of acoustic phonons, and (4) analyse and interpret the acquired results on the basis of experimentally constrained FEM studies of plasmons, acoustic phonons, and optomechanics.

The Postdoctoral Researcher will be responsible for:

1. Collaboration with the project partners, with short-term internships in Finland and, potentially, Germany, Spain or Japan.

2. The design and nanofabrication of the plasmonic-semiconducting nanomembranes, both within the facilities of the Adam Mickiewicz University as well as abroad in the frame of international collaborations.

3. Development of the time- and momentum-resolved Brillouin light scattering setup and interpretation of the results.

4. Participation in conceiving theoretical models and organizing numerical calculations.

5. Continuous reporting, manuscript writing, dissemination of results in conferences, assisting the MSc student.

6. Participation in the coordination of the international collaboration and the research visits abroad.

Through all the above, the Postdoctoral Researcher is expected to produce high-impact, first-author publications, become an essential member of international scientific collaborations and acquire useful skills and expertise for Academic or R&D positions.

1. **Requirments and qualifications**

The competition is open to individuals who meet the requirements specified in Article 113 of the Law on Higher Education and Science of 20 July 2018 (Journal of Laws of 2022, item 574 i.e. as amended; Polish: Dz.U. z 2022 r. poz. 574 z późn. zmianami) and who meet the following requirements:

The required professional qualifications are:

* Ph.D. in Physics, or other related fields such as: Materials Science, Physical Chemistry, or Electrical Engineering.
* Excellent knowledge of optics, lasers, spectroscopic or time-domain techniques.
* Experience in writing scientific manuscripts and giving scientific talks.
* Adequate experience with Matlab, Comsol, Python or similar tools.
* Desired experience with LabView or willingness to learn it.
* Fulfilled formal requirements regarding the date of obtaining the doctoral degree in accordancewith the regulations of the National Science Center <https://www.ncn.gov.pl/sites/default/files/pliki/uchwaly-rady/2021/uchwala81_2021-zal1.pdf>. Persons who do not have a doctoral degree may apply, provided they plan their defense before the date of signing the employment contract (February 1st 2023).

1. **Required languages**

4. Language: English

5. Level: fluent or native

1. **Required research, teaching or mixed experience**

- Proven experience in optics, lasers, spectroscopic or time-domain techniques.

- Experience in building optical systems.

- Independence, good organization of work, ability to work in a team.

- Experience in writing scientific publications and conference presentations.

- Good knowledge of software such as: Matlab, Comsol or Python, LabView, OriginLab, CorelDraw, LaTex or similar tools.

- Knowledge of condensed matter physics, structural dynamics, electrodynamics and statistical physics, heat transport. Knowledge of nanofabrication methods will be an additional advantage.

1. **Benefits**

* financial bonuses for high impact publications
* an atmosphere of respect and cooperation
* supporting employees with disabilities
* flexible working hours
* funding for language learning
* co-financing of training and courses
* additional days off for education
* life insurance
* pension plan
* savings and investment fund
* preferential loans
* additional social benefits
* leisure-time funding
* subsidizing children's vacations
* "13th" salary

1. **Eligibility criteria**

1. Matching of the candidate's scientific profile with the advertisement.

2. Number, scientific level of the candidate's scientific publications.

3. Number, scientific level and of the candidate's scientific conference presentations.

4. Grade on the diploma.

5. Internships and participation in research projects.

1. **The selection process**
2. Competition committee begins working no later than 14 days after the deadline for submission of documents.
3. Formal evaluation of submitted proposals.
4. Call to provide additional or missing documents if necessary.
5. Selection of candidates for the interview stage.
6. Interviews for candidates who meet the formal requirements.
7. The chair of the competition committee announces the results and informs the candidates. This information will include justification with a reference to candidates' strengths and weaknesses. Submitted documents will be sent back to candidates.
8. **Prospects for professional development**

- supervision in building a scientific profile through the publication in high-impact scientific journals,

- assistance in writing grant applications in domestic (FNP, NCN) and foreign (MSCA, Humboldt) research projects,

- establishing cooperation with renowned research centers in the world.

**RODO Information Clause :**

Pursuant to Article 13 of the General Data Protection Regulation of 27 April 2016. (Official Journal of the EU L 119 of 04.05.2016) we inform that:

1. The controller of your personal data is Adam Mickiewicz University, Poznań with the official seat: ul. Henryka Wieniawskiego 1, 61 - 712 Poznań.
2. The personal data controller has appointed a Data Protection Officer overseeing the correctness of the processing of personal data, who can be contacted via e-mail: iod@amu.edu.pl.
3. The purpose of processing your personal data is to carry out the recruitment process for the indicated job position.
4. The legal basis for the processing of your personal data is Article 6(1)(a) of the General Data Protection Regulation of 27 April 2016 and the Labour Code of 26 June 1974. (Journal of Laws of 1998 N21, item 94 as amended).
5. Your personal data will be stored for a period of 6 months from the end of the recruitment process.
6. Your personal data will not be made available to other entities, with the exception of entities authorized by law. Access to your data will be given to persons authorized by the Controller to process them in the performance of their duties.
7. You have the right to access your data and, subject to the law, the right to rectification, erasure, restriction of processing, the right to data portability, the right to object to processing, the right to withdraw consent at any time.
8. You have the right to lodge a complaint to the supervisory authority - the Chairman of the Office for Personal Data Protection, ul.Stawki 2, 00 - 193 Warsaw.
9. Providing personal data is mandatory under the law, otherwise it is voluntary.
10. Your personal data will not be processed by automated means and will not be subject to profiling.