

INSTITUTION: **The National Centre for Nuclear Research**



CITY: Otwock / Świerk

POSITION: **Ph.D. student scholarship** at MAB NOMATEN\_447

DISCIPLINE: physic, material engineering

POSTED: 04|11|2025

EXPIRES: 25|11|2025

WEBSITE: <https://www.ncbj.gov.pl/en/praca/phd-student-scholarship-mab-nomaten447>

KEY WORDS: physics, material engineering, nanoindentation, electron microscopy, solid-state physics

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#### **Ph.D. student scholarship at CoE NOMATEN (NCBJ)**

**Recruitment for the Ph.D. student scholarship under the SONATA BIS project (2023/50/E/ST11/00212) at the National Centre for Nuclear Research (NCBJ, Poland).**

The project is being carried out within the NOMATEN Centre of Excellence (<https://nomaten.ncbj.gov.pl/>).

**Location:** Otwock - Świerk - in the outskirts of Warsaw with daily transport services provided.

#### **Research topic and task description:**

The selected candidate will carry out the research related to the project entitled "Development of high entropy alloys with high radiation resistance and elevated mechanical properties at high temperatures", which is funded by the National Science Center under the Sonata BIS competition – project number 2023/50/E/ST11/00212 (project leader Dr. Lukasz Kurpaska).

Materials under neutron irradiation are subject to irradiation damage and degradation of their mechanical properties. Noting that neutron irradiation studies for research purposes are complicated, time-consuming, and expensive, emulating neutron irradiation damage by much faster and cost-effective ion irradiation is of high interest. At the same time, ion irradiation avoids activation of the irradiated material. However, the emulation of neutron irradiation by ion irradiation damage is limited by transferability issues and experimental uncertainties linked to the limited penetration of the energetic ions. The goal of the work is to improve our understanding of the phenomena associated with the formation and evolution of ion irradiation-induced defects and their role in the deformation behaviour of model Co-free high entropy

alloys. The topic is in line with research carried out by the NCBJ and the Ph.D. candidate is expected to effectively improve experimental/computational protocols for the fast, safe, and reliable assessment of the irradiation impact on the mechanical properties of the new generation of alloys.

From the experimental point of view, nanoindentation will be carried out using different indenter shapes to study irradiation hardening. Radiation-induced defects will be identified by TEM. Complementary analyses will be carried out, including plasma-focused ion beam tomography of indents. The project aims at establishing and validating a testing protocol with investigations to support the experimental activities by complementary numerical simulations. Nanoindentation is known to be subject to size effects, which are influenced by irradiation. The project will contribute to developing understanding of deformation mechanisms in irradiated alloys through a statistical sampling approach across a wide variety of specimens with different chemical compositions. A machine-learning approach will be developed to evaluate nanoindentation responses in irradiated alloys.

**Ph.D. programme:**

The duration of the Doctoral Programme is expected to be three to four years (maximum). The Ph.D. candidate will join Warsaw University of Technology, Material Engineering Department PhD school where he/she will conduct studies in the domain of material engineering or NCBJ PhD school if the candidate would like to pursue the topic in physics.

**We offer:**

- Attractive, dynamic, international work environments at the forefront of nuclear science and development in renowned laboratories.
- The job environment offers a unique opportunity to be involved in and to support EU policies. The scientific activities require frequent interactions with European and international stakeholders which is an asset for further professional career development.
- Specifically, we offer 36 months scholarship of 5000 PLN per month from the Sonata Bis project at NCBJ with additional scholarship originating from the PhD school.
- work at NCBJ in the only research institute in Poland with a nuclear reactor;
- the opportunity to participate in the creation of a new international unit, the chance for personal success related to the development of CoE NOMATEN;
- the opportunity for personal growth through a diverse range of tasks and challenges in the study of materials dedicated to nuclear technologies;
- the opportunity to participate in international and national scientific conferences, projects, and collaborations;
- additional annual salary and a package of benefits from the Company's Social Benefits Fund (among other things, holiday subsidies);
- free company transportation providing access to Świerk from many places in Warsaw and the surrounding area (detailed schedule in [bus.swierk.pl](http://bus.swierk.pl));

**Candidates should:**

- become enrolled in a PhD programme.

Candidates who are already enrolled in a doctoral study program for less than 12 months are also eligible. Within six months from the request for confirmation of interest in the position, the selected candidate will have to be enrolled in the PhD program in Material Engineering at the Warsaw University of Technology or in Physics at NCBJ.

**Requirements:**

- MSc degree (or equivalent) within a scientific area of relevance to the Doctoral Programme (e.g., physics, materials science, nuclear engineering, mechanical engineering, or equivalent) giving access to doctoral studies;
- scientific experience documented by scientific publications;
- knowledge of the fundamentals of electron microscopy, and understanding of experimental methods of solid-state physics;
- theoretical background in physics-based modelling, including numerical methods, is an advantage;
- experience in examining radiation-damaged materials and/or mechanical testing at high temperatures would be a plus;
- willingness to continuously acquire knowledge and improve qualifications, creativity, responsibility, good organization, ability to work in a team, and communication skills;
- excellent oral and written English language skills.

**Required documents:**

- a cover letter;
- a resume containing the clause "I agree to process my personal data contained in the job offer for the purposes necessary for the recruitment process";
- letter(s) of recommendation;
- a copy of the diploma confirming the MSc. Degree (or equivalent);
- list of scientific publications;
- self-presentation, containing a description of the candidate's scientific achievements, along with, patents, and implementations, description of other achievements (conference presentations, internships, etc.);
- any other documents that may support the assessment.

**Contact:** [magdalena.jedrkwicz@ncbj.gov.pl](mailto:magdalena.jedrkwicz@ncbj.gov.pl) (HR manager)

All applications should be sent by e-mail to: [magdalena.jedrkwicz@ncbj.gov.pl](mailto:magdalena.jedrkwicz@ncbj.gov.pl)

**Selection Procedure:**

Applicants will be evaluated by a commission composed of scientific staff members from NCBJ, including the Sonata Bis Project Coordinator, HR specialists, and a professor specializing in the given research discipline.

Interviews will be held in English and may be carried out remotely by video call.

Submitted documents will not be returned. We will contact selected candidates.

**Additional comments:**

At NCBJ there is the internal procedure for the report of breaches of law. Anyone interested in its content can access it at any time on the website: <https://www.ncbj.gov.pl/sites/default/files/prasa/INTERNAL%20NOTIFICATI...>

Information in accordance with Article 13 RODO on the processing of personal data:

1. The Personal Data Controller of your personal data is the National Centre for Nuclear Research (hereinafter referred to as Controller or NCBJ) with its registered office in Otwock, 7 Andrzej Sołtan Street, 05-400 Otwock.
2. Your personal data will be processed for recruitment purposes on the basis of applicable law, including the Labour Code. Data not required by law, provided by you in your documents, will be processed on the basis of your consent. Your consent is given by the transfer of this data.
3. The full content of the information clause of Article 13 RODO is available at <https://www.ncbj.gov.pl/en/gdpr>



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