



Senior Scientist position in Laboratory of Tandetron, Department of Neutron Physics

We have an open position for someone to complement our existing group dealing with ion beam modification and synthesis of nano and microstructured materials, radiation defect evolution study in 2D materials and other materials, radiation hardness testing and modification of nuclear materials in general by energetic ion beams, ion beam technology and instrumentation for ion beam analytical methods, ion beam elemental tomography etc. We are looking for independent senior scientist which will strengthen our team in the newly funded ERDF project devoted to material development, synthesis by energetic ion beams for bioapplication, sensorics, optics and electronics.

Our laboratory of Tandetron (LT)

The [medium-current \(MC\) version Tandetron](#) with a maximum terminal voltage of 3MV is used for the production of ion beams with energies in the range from 600 keV to about 30 MeV. Ions typically from H^+ up to Au^{n+} are available for ion-beam analysis and ion implantation depending on the ion-charge state. The LT is equipped with Rutherford backscattering spectrometry (RBS), RBS-channelling, elastic recoil detection analysis (ERDA), ERDA with a time-of-flight (TOF) spectrometer, particle-induced emission of X-rays (PIXE), PIXE-channelling, particle-induced γ -ray emission (PIGE). High-energy ion-beam implantation/irradiation end stages and ion-microprobe lithography are employed for the nano- and microstructure synthesis and modification of materials to obtain new functional properties. An ion-microbeam system equipped with a newly designed bigger chamber with a detector array is used for 3D elemental mapping using PIXE, PIGE, RBS; for single ion-beam irradiation; for structural studies of internal morphology via scanning transmission ion microscopy (STIM) analysis and ion lithography with medium heavy ions. Moreover, the LT is equipped with a small deposition and complementary analytical laboratory including layer deposition techniques (CVD, a two-magnetron sputtering system for various coating depositions, a laser source for the irradiation, ablation and microstructuring of the solid phase, spin coating for polymer nanocomposite deposition) and analytical methods (optical ellipsometry, optical analysis in the UV–Vis–NIR wavelength range).

The above described instrumentation portfolio is used among others in [synthesis and characterisation](#) of the nanostructures for optics, spintronics and photonics by means ion beams at Tandetron accelerator. The main research directions of the [Laboratory of Tandetron](#) (LT) include the preparation and characterisation of micro- and nanostructured materials, which are of interest for basic and oriented research in material, environmental and biomedical sciences. Ion-beam analytical (IBA) methods are employed in the investigation of materials coming from material research, industry, micro- and nanotechnology, electronics, optics and laser technology, and in chemical, biological and environmental investigation in general. We thoroughly improve the instrumentation of the LT to make it competitive in the European scientific space and to enlarge the portfolio of our ion-beam instruments. We have a very fruitful collaboration with several excellent ion-beam centres in Europe (Helmholtz-Zentrum Dresden-Rossendorf, Germany; Ion-Beam Centre of the Hungarian Academy of Sciences, ATOMKI, Hungary, etc., Brookhaven National Laboratory, USA etc.). The LT is closely connected to other ion-beam centres in Europe, mainly to the [RADIATE](#) consortium, unifying the most important ion-beam centres in Europe.

Institute

[Nuclear Physics Institute](#) of the Czech Academy of Sciences, p. r. i., (NPI). NPI is one of 54 public research institutions of the Czech Academy of Sciences (CAS). With its approximately 260 employees (including about 100 scientists (Ph.D.) and about 40 Ph.D. students) it is the largest Czech institution in



the field of nuclear physics. The NPI has long-standing experience and achieves internationally recognised results in research oriented towards the environment, health and energy security, in environmental science, medicine, radiopharmacy, materials research, which are based on instrumental and technological competences in accelerator technology and nuclear analytical methods. The activities of the NPI are strongly oriented towards participation in current and large international collaborations. The collaboration with [ALICE@CERN](#), [STAR@BNL](#) and [HADES/CBM@GSI/FAIR](#) is focused on the study of hot and dense nuclear matter produced by heavy ion collisions. The [KATRIN](#) project focuses on increasing the sensitivity of neutrino mass determination. [ESS](#) is a pan-European spallation neutron source under construction. In [GANIL/SPIRAL2](#), the NPI groups are involved in studies of nuclei far from the stability line and deal with the preparation of equipment for oriented research with neutrons. Czech involvement in international cooperation is supported by the role of the NPI as a recipient of the large research infrastructures (RI) [ESS-Scandinavia-CZ](#), [FAIR-CZ](#) and [SPIRAL2-CZ](#) and RI partner [BNL-CZ](#) and [CERN-CZ](#) included in the Roadmap of large infrastructures for research, experimental development and innovation of the Czech Republic 2016 – 2022 ([RLIR](#)). Newly, NPI is involved in the consortium of the most important European ion, neutron and electron beam centers in Europe for the circular economy with a strong emphasis on usable application outputs and cooperation with industrial partners ([HORIZON ReMade ARI 101058414](#)). [CANAM](#) - The Center for Accelerators and Nuclear Analytical Methods, which connects the large experimental facilities of the NPI in a synergistic network, is a center for researching tasks in a wide range of scientific fields using beams of accelerated ions on cyclotron accelerators [U-120M](#) and [TR-24](#), electrostatic accelerators [Tandetron 4130 MC](#) and the [MILEA](#) accelerator mass spectrometer. Also included are neutron beams - devices installed on the [neutron channels](#) of the LVR-15 research reactor and fast neutrons from production targets on cyclotrons. The [MT25 microtron](#), a cyclic photon beam electron accelerator, is also in operation.

Job requirements

- A PhD degree in a relevant topic with high quality research output in the leading scientific journals and conferences.
- A track record working with state-of-the-art technologies in ion beam technology, nuclear physics and/or solid state physics, material science and the clear ambition to develop oneself in a direction of synergy between material science and energetic ion beam physics.
- A clear and ambitious research vision.
- Applications from candidates with a track-record and vision for ion beam physics and applications will be particularly welcome.
- Effective communication and organization skills.
- Strong cooperation skills and the ability to work in teams.
- An ambition and ability to lead students and or assist in their theses preparation is highly welcome.
- Experience in acquiring external research funding from (inter-)national funding bodies or industry is an asset.
- Excellent proficiency (written and verbal) in English.



Conditions of employment

- A meaningful job in a dynamic and ambitious research institute, in an interdisciplinary setting and within an international network.
- Reduced working hours (36 hours/week - at 100% full-time).
- Five weeks of vacation + one week of additional vacation.
- Allowance for catering - meal vouchers + canteen directly in the area of institute.
- Contribution from the cultural and social needs fund (recreation, camps, theatre, glasses, etc.)
- Education, language courses.
- Friendly and pleasant team.
- Possibility to park in a closed and guarded area.
- Possibility to apply for an apartment of the Academy of Sciences of the Czech Republic.
- Experienced colleagues who will help with learning in the beginning.

Information and application

Candidates are encouraged to contact us before they apply to get more information about the position. Please contact prof. Anna Mackova (mackova@ujf.cas.cz).

How to apply

If you are interested in the position of senior scientist in LT group of NPI and you would like to apply, we invite you to submit a complete application by using mail above.

Your application must contain the following documents:

- A cover letter explaining your motivation and suitability for the position.
- A detailed CV including a full list of publications and achievements. Please also select 5 publications of specific importance and briefly describe their impact.
- A research statement of 2-3 pages.
- The contact information of three referees. These will not be contacted unless you are shortlisted and invited for an interview.