Joint Institute for Nuclear Research
International Intergovernmental Organization

SCIENCE BRINGS NATIONS TOGETHER

Postdoctoral Programme in research of thermal processes and heat transfer in the Time Projection Chamber of the MPD Detector, NICA project

12-month contract, renewable for another max. 24 months

Your mission

The main purpose of this position is to study heat transfer processes in the gas volume of the MPD's Time Projection Chamber (TPC) and their influence on the drift dynamics of primary ionization electrons.

This research will focus on the computational analysis of the turbulent convection in the TPC gas volume caused by the heat generated by the TPC readout electronics, electronics of neighboring detectors (TOF, ECAL, ITS, etc.) and MPD subsystems (such as magnet coils, power cables, etc.).

Also, this research will be focus on study and optimization of TPC thermal stabilization system and cooling system and study of the TPC spatial resolution degradation due to thermal effects. The aim of the research is to develop valid multiphysical model of the processes in the TPC and establish connection between heat generation around of the TPC and its spatial resolution.

Your tasks

You will work with MPD sub-detectors groups (TPC, TOF, ECAL, engineering, integration, etc.) Your research programme will focus on:

- Computational analysis of thermal stabilization of TPC gas volume and simulation of quasi-stationary convective heat transfer.
- Taking into account the influence of fluctuations in the temperature of the TPC gas mixture on the drift of primary ionization electrons from the tracks of charged particles.
- Development and optimization of the TPC thermal stabilization system in order to stabilization TPC spatial resolution.

Constraints and risks

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The candidate is expected to participate in intensive communication with the team responsible persons for the development of the TPC thermal stabilization system, both in LHEP and external organizations. Travel to facilities responsible for the development of the TPC thermal stabilization and cooling systems will be required.

The work will be carried out at the NICA accelerator facility, where by the necessary authorizations will be issued following the annual medical examination arranged by the employer.

Depending on your citizenship, you may need to obtain a visa and this process can last several months. JINR offers all the necessary support for obtaining the entry permit for the Russian Federation.

Your profile

- Highly motivated candidate with a PhD (obtained less than 5 years ago) in condensed matter physics, thermal physics or in a similar field.
- Age under 40, have not had more than 3 temporary positions.
- Experience in the development and research of numerical models of heat transfer gas dynamics, including the solution of three-dimensional convection problems is a prerequisite.
- Experienced in implementing projects related to elementary particle detectors include gas discharge detectors.
- Can develop algorithms to solve physical problems and have experience with scientific tools such as COMSOL Multiphysics, Matlab Simscape, Garfield++
- As an international intergovernmental research organization, we are particularly keen to ensure that we also attract applicants from outside of Russia. You must have good knowledge of English and be willing to learn Russian (a language course will be provided by JINR).

What we offer

High quality of life

Called the "Island of Stability", the city of Dubna is ideally located on the bank of Europe's largest waterway — the Volga River (only 2.5 hours from Moscow by train or bus and 1.5 hours by car from Sheremetyevo International Airport). It is important for us that our employees quickly and easily adapt to the new living conditions and have a healthy work-life balance. Therefore, we offer accommodation in comfortable guest-house rooms (for singles), or fully furnished flats owned by JINR, and annual paid leave.

Prospects

We guarantee you a **12-months postdoctoral contract, renewable for another max. 24 months (36 month in total)**, in a multicultural scientific environment.

Remuneration

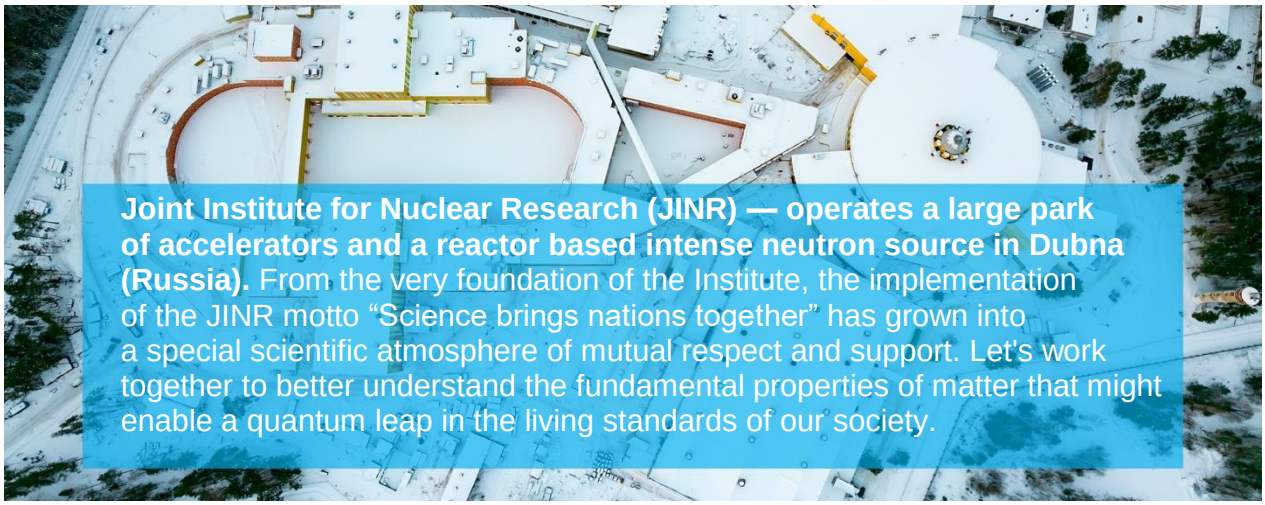
2300 USD per month, paid in Russian rubles at the planned exchange rate (forecasted year-average), which is adopted with the JINR budget for the current year. In 2023, the exchange rate is 69.2 Russian rubles per 1 USD.
Income tax of 13% is applied. The employer shall pay no pension insurance.

Benefits

We offer considerable social benefits: settling-in allowance, air fare (except for family members), free local health insurance for you and your family members, relocation assistance (under certain

conditions), free public school or kindergarten attendance for children. We also offer free Russian courses and subsidies for the use of JINR sports infrastructure (Olympic swimming pool, stadium, gym, etc.), as well as access to a variety of cultural activities.

Apply now



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