



## **Postdoctoral Programme in Study of Oscillations of Atmospheric Neutrinos in the JUNO experiment**

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

### **Your mission**

The main objective of this position is development of the analysis with subsequent application to the data with a goal of determination of Neutrino Mass Ordering (NMO) and measurement of neutrino mixing angle  $\theta_{23}$  by the observation of interactions of atmospheric neutrinos  $\nu_\mu/\bar{\nu}_\mu/\nu_e/\bar{\nu}_e$  of energies between 100 MeV and 10 GeV within JUNO detector. Develop a combined analysis based on both the reactor electron antineutrino data and atmospheric neutrino data of the JUNO experiment in order to determine the NMO with high statistical significance. The work will be carried out with close interactions within international collaboration of the JUNO experiment.

### **Your tasks**

You will work with the JINR group of the JUNO experiment. Your research programme will include:

- Developing a numerical model of the experimental setup for the atmospheric neutrino studies. Carrying out the statistical analysis of the JUNO atmospheric data. Carrying out the combined analysis of the JUNO atmospheric and reactor data.
- Understanding the detector response based on the MC and calibration data.
- Development of the algorithms of energy and direction reconstruction, particle identification.
- Estimation of the backgrounds.
- Taking part in the detector commissioning and the shifts.
- Supervising Master and Bachelor students, working on the same topic.

### **Constraints and risks**

The candidate is expected to undertake international business trips for periods varying from 1 to 4 weeks. Shift work may be necessary.

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 particle physics.
- Age under 40, have not had more than 3 temporary positions.
- Strong background in experimental physics is a prerequisite.
- Practical experience in neutrino oscillation physics, especially with atmospheric neutrinos would be advantageous.
- Practical experience with software programming in C++, and, possibly in Python is a requirement.
- 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

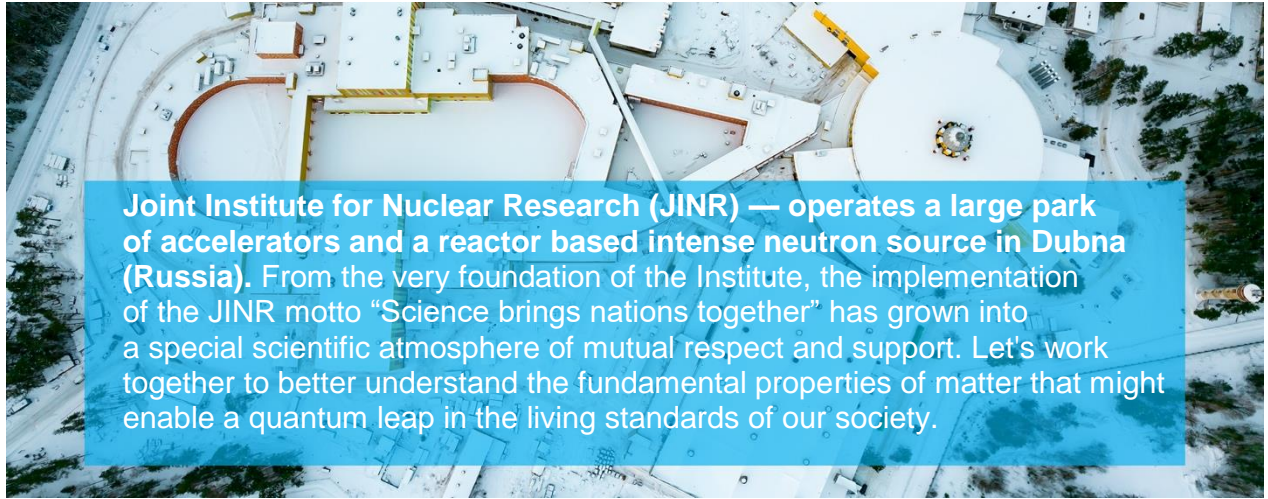
2300 USD per month, paid in Russian rubles at the planned exchange rate (forecasted year-average), which is adopted with the JINR budget for the current year. In 2024, the exchange rate is 90.1 Russian rubles per 1 USD.

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](#)



**Joint Institute for Nuclear Research (JINR)** — operates a large park of accelerators and a reactor based intense neutron source in Dubna (Russia). From the very foundation of the Institute, the implementation of the JINR motto “Science brings nations together” has grown into a special scientific atmosphere of mutual respect and support. Let's work together to better understand the fundamental properties of matter that might enable a quantum leap in the living standards of our society.

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