Joint Institute for Nuclear Research

International Intergovernmental Organization

SCIENCE BRINGS NATIONS TOGETHER

Postdoctoral Programme in Spin Physics on New Collider Experiments

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

Your mission

The main objective of this position is aimed at studying and calculating the contributions from various sources to the total spin of nucleons (protons and neutrons). Investigation of the dependence of the contribution from different components (quark, gluon, orbital motion of partons contribution) to the total spin of the nucleon. Investigation of the detailed 3D parton structure of the nucleon using transverse momentum dependent distribution functions (TMD PDF). Determination of the contribution of the gluon component to the total proton spin. Calculation of the PDFs at very low scales of x variable accessible at next generation of colliders in collisions of electrons with protons and nuclei.

Your tasks

You will work with our group in the field of high energy particle physics. Your research programme will focus on:

- Simulate the contribution of various components to the total proton spin using existing models of PDF parton distributions. Studying the dependence of distribution functions PDF on the momentum transfer Q and the momentum fraction x per parton. Estimation of the effect of multiloop corrections on the PDF values.
- Account for the transverse motion of partons refine the value of the contribution of the partons orbital motion to the total spin of the nucleon.
- Calculate the cross sections for the production of quarks in deep inelastic scattering, as well as the structure functions of the proton.
- Perform experimental proposition for the investigation of theoretical predictions on nucleon spin by A.Efremov and O.Teryaev.

Constraints and risks

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The candidate is expected to undertake international business trips for periods varying from 1 to 4 weeks. The work may require access to the accelerator facilities, whereby 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 physics or in a similar field.
- Age under 40, have not had more than 3 temporary positions.
- Strong background in experimental or theoretical physics is a prerequisite.
- Practical experience in data analysis with AI/ML methods would be advantageous.
- 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

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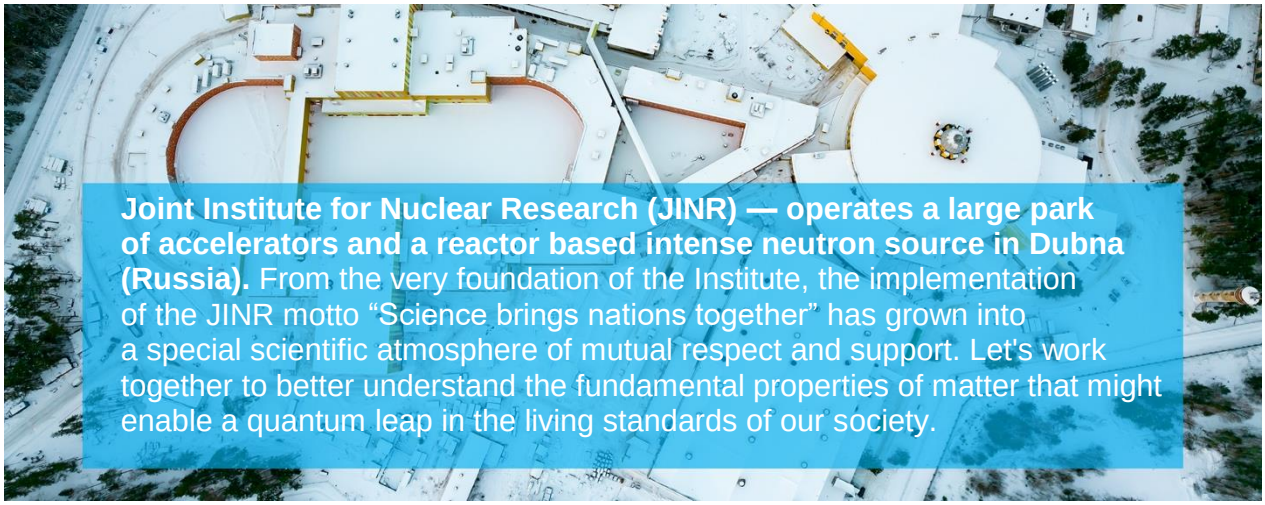

Joint Institute for Nuclear Research (JINR) — operates a large park of accelerators and a reactor based intense neutron source in Dubna (Russia). From the very foundation of the Institute, the implementation of the JINR motto “Science brings nations together” has grown into a special scientific atmosphere 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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