Postdoctoral Programme in Experimental Search for Neutrinoless Double Beta Decay of Ge-76

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

Your mission

The LEGEND experiment is designed to search for neutrinoless double beta (0νββ) decay of Ge-76. LEGEND operates with bare germanium semiconductor detectors (enriched in Ge-76) directly immersed in liquid argon instrumented to read out argon scintillations for vetoing background events. Thanks to this approach, in the predecessor GERDA experiment the background level was reduced down to the unprecedented value of 5×10^{-4} counts keV^{-1} kg^{-1} yr^{-1}. For further reduction of the background in the LEGEND experiment, our JINR group, together with international collaborators, is constantly performing the R&D for novel germanium detector types, new ultra-low background construction materials and the effective methods of argon scintillation readout. Our group has gained solid experience in the design, preparation and integration phases of the GERDA experiment, as well as in running the experiment and data analysis. This will help the JINR group to maintain a strong position in the LEGEND project. However, we are willing to enlarge the analysis part of our group so we are looking for a person who will mainly work on modelling and data analysis. LEGEND is truly a worldwide collaboration that includes about 240 scientists from 47 institutions. Our group has especially good relations with the Technical University of Munich (Germany) and Max Planck Institute for Nuclear Physics (Heidelberg, Germany), so working visits to them are expected, as well as to the Gran Sasso National Laboratory in Italy, where the first phase of LEGEND is being commissioned.

Your tasks

You are expected to join the international LEGEND data analysis team. A low-background experiment such as LEGEND should allow searching not only for 0νββ decay of Ge-76, but also for many other rare processes and exciting particles (like Super-WIMPs, etc.). Therefore, depending on your choice, you will have a unique opportunity either to join the common 0νββ analysis and work, for example, on a background model or perform your own search for one of

the dozens of intriguing decays and/or particles.

Constraints and risks

The candidate is expected to go on international business trips for periods of 1 to 4 weeks to participate in LEGEND collaboration meetings and workshops. Work in shifts and work on the weekends may be necessary, remote work is allowed.

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 or nuclear physics.
- Age under 40, have not had more than 3 temporary positions.
- Strong background in experimental physics is a prerequisite.
- Practical experience in data analysis.
- Good programming skills (algorithms, OOP, C++, Python) are required, knowledge of ROOT, GEANT4, machine (deep) learning techniques and Big Data processing 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 a 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 generous social benefits (settling-in allowance, free health insurance for you and your family members), relocation assistance (under certain conditions), free school or kindergarten attendance for children. We also offer free language 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.

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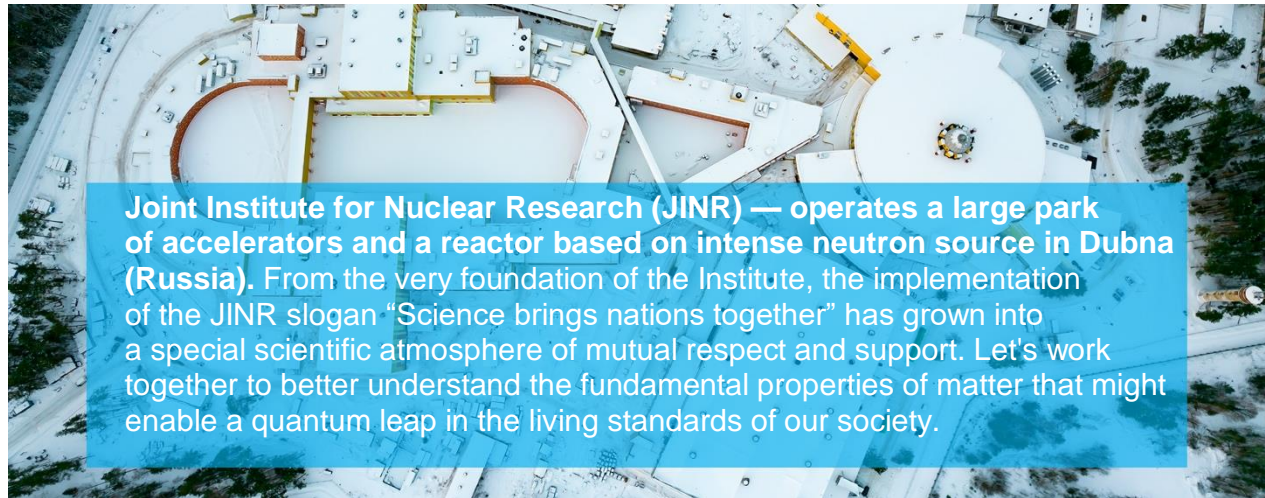
Joint Institute for Nuclear Research (JINR) — operates a large park of accelerators and a reactor based on intense neutron source in Dubna (Russia). From the very foundation of the Institute, the implementation of the JINR slogan "Science brings nations together" has grown into a special scientific atmosphere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