Offer #2025-08894

Junior research leader in theoretical quantum computing

Contract type : Fixed-term contract

Level of qualifications required : PhD or equivalent

Fonction : Tempary Research Position

Context

The project NISQ2LSQ funded by the French Quantum Strategy aims to accelerate R&D efforts in the theory and design of hardware-efficient, fault-tolerant quantum codes, focusing on bosonic codes and quantum low-density parity codes (LDPC). On the hardware side, the targeted platforms are superconducting and photonic qubits, as well as neutral atoms.

The Junior Research Leader will be hosted at Inria Paris, in the COSMIQ team which already has an expertise in the design and decoding of quantum LDPC codes. The position is open for a fixed-term contract of 3 years. The applicant can also be a young researcher, already hired on a permanent position and intending to pursue a research topic in line with the above theme. In this second case, the funding will be used to cover the hiring of PhD students and/or postdocs, collaborating with the young researcher.

Assignment

The Junior Research Leader will develop the theory of fault-tolerant quantum computing based on high-rate quantum codes, especially quantum LDPC codes. These codes are attracting a lot of attention because they offer a drastic overhead reduction for fault tolerance and recent experimental progress hints that they might be implementable sooner than initially anticipated.

In this context, a pressing issue is to understand how to perform fault-tolerant logical gates when the information is encoded in quantum LDPC codes. A challenge here is to be able to rigorously assess the performance of various schemes, and this requires the development of tools for the simulation of such procedures. For this, it will be crucial to interact with experimental groups working on various hardware approaches (neutral atoms, photonic qubits) in order to study realistic noise models, and adapt the fault-tolerant techniques to the constraints of the relevant hardware platforms.

The Junior Research Leader is expected to build a team to address these questions. They will be encouraged to develop collaborations with various experimental groups in the Ile-de-France area, and in particular with the quantum startups

Main activities

The Junior Research Leader will conduct research on the topic described above.

Skills

Candidates should have experience in interacting with physicists, as well as in the development of numerical software for the simulation of quantum codes, including fault-tolerant gates and error correction.

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking (after 6 months of employment) and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

General Information

- **Theme/Domain :** Algorithmics, Computer Algebra and Cryptology
- **Town/city :** Paris
- **Inria Center :** Centre Inria de Paris
- **Starting date :** 2025-09-01
- **Duration of contract :** 3 years
- **Deadline to apply :** 2025-08-06

Contacts

- **Inria Team :** COSMIQ
- **Recruiter :**
  Leverrier Anthony / Anthony.Leverrier@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

Defence Security :
This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST).Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy :
As part of its diversity policy, all Inria positions are accessible to people with disabilities.