## **RAMAN RESEARCH INSTITUTE**

### Announcement of opportunity for experimental and theoretical research in Quantum Communications under India's National Quantum Mission

#### Advt. no.09/2025 dt. 11 April 2025

**Raman Research Institute** invites applications from individuals for <u>two Research Associate positions</u> to contribute towards experimental and theoretical challenges in the domain of secure quantum communications. The candidates must possess excellent and consistent academic record and core competence and research aptitude in Physics.

The Quantum Information and Computing (QuIC) lab of RRI has been working on several approaches in secure quantum communications and has achieved notable global success in this sphere. The QuIC lab has now been awarded a mega project under India's National Quantum Mission (NQM) titled "**A multi node quantum repeater network for entanglement distribution based quantum communication**." Professor Urbasi Sinha of RRI who heads the QuIC lab at RRI Bangalore is the lead Principal Investigator for the project with RRI Bangalore as the lead institution. The other institutions involved in the consortium include HRI Prayagraj, IIT Tirupati, IIT Patna and IISER Mohali. The current advertisement is for positions in the QuIC lab under NQM.

# Academic and technology focus of the project that the successful applicants will be contributing <u>to:</u>

The QuIC lab at RRI will establish a multi node quantum repeater network by developing high end quantum memories based on vacancies in diamond, commensurate single and entangled photon sources as well as all relevant experimental science and technology goals relevant to this grand mission. They will also collaborate with theory Co-PIs at HRI Prayagraj, IISER Mohali as well as international partners towards robust repeater frameworks. Quantum Repeater technology is globally at a nascent stage of development with a global record of 2-3 repeater node- based networks so far. Successful candidates will have the opportunity to contribute to a vibrant globally competitive research program that will also involve international exposure. Prof. Urbasi Sinha also holds the Canada Excellence Research professorship at the University of Calgary, Canada. Our team members benefit from:

- Access to advanced facilities and equipment across two international locations
- Regular travel opportunities between India and Canada
- Collaboration with leading scientists in both countries
- Exposure to diverse research methodologies and cultural perspectives
- The chance to work on breakthrough experiments that bridge theoretical concepts with practical applications
- Strong industry connections in both regions
- Mentorship from established researchers in both locations

Integrating vacancy-based memories into multi-node quantum repeater networks presents the overarching challenge, requiring efficient entanglement distribution and swapping protocols across heterogeneous nodes. Quantum Repeater technology is globally at a nascent stage of development with a global record of 2-3 repeater node- based networks so far. Success would enable a flexible quantum network infrastructure that leverages the unique strengths of diamond vacancy centres, revolutionizing secure communication, distributed quantum computing, and quantum sensing toward a global quantum internet.

We are currently looking for two **Research Associate (RA) appointments** within the QuIC lab, Light and Matter Physics group of the Institute. Candidates with fresh PhD degrees will be considered for an RA-I role, those with one year of post-doctoral experience will be considered for an RA-II role and those with two or more years of post-doctoral experience will be considered for an RA-III role.

**Remuneration:** Research Associate I (RA I) – 58,000 INR plus 30% HRA Research Associate II (RA II) – 61,000 INR plus 30% HRA Research Associate III (RA III) – 67,000 INR plus 30% HRA

Those who have submitted their thesis but not yet been awarded the PhD degree can also apply. Their remuneration will be 54,600 INR (consolidated) till they obtain the PhD degree. **Eligibility:** 

**Age:** Not more than 32 Years for RA I role, 33 years for RA II role and 34 years for the RA III role as on the closing date for receiving the completed application forms online. Age relaxation may be considered for candidates with relevant research experience.

#### **Essential (for both positions):**

PhD in Physics, Engineering or related areas.

#### Desirable:

#### Position one:

The candidate should be motivated and should have a flair for experimental work as well as programming skills. PhD in quantum information, quantum optics or other quantum technology domains.

The candidate should have experience in one or more of the following -

- **1.** Prior experience of working in an optics based lab environment and familiarity with practical handling of optical and opto-mechanical components.
- 2. Knowledge in controlling of equipment using Labview.
- 3. Previous work experience in quantum information/ quantum communication based research.
- 4. Programming knowledge in Matlab / Mathematica/ C++/ Python.

#### Position two:

The candidate should be motivated and be proficient in quantum information theory as well as programming skills. PhD in quantum information, quantum optics or other quantum technology domains.

The candidate should have experience in one or more of the following -

- 1. Prior experience of peer reviewed theoretical work in the domain of secure quantum communications; particularly quantum memory, quantum repeater and quantum networks based research.
- 2. Programming knowledge in Matlab/ Mathematica/ C++/ Python.

#### **Tenure:**

Initially 1 year, extendable up to three more years of project subject to satisfactory performance and annual review by expert committee.

#### Selection procedure:

Candidates who qualify in the required criteria will be called for an interview.

Applications may be sent to <u>quic-job@rri.res.in</u>.

The application should consist of the candidate's CV with academic qualifications details, work experience details as well as a statement on fulfilment of essential and desirable criteria. The application should also include contact details of two or more referees, who may be contacted by the institute for their independent reviews.

#### Closing date for receiving the applications: 15<sup>th</sup> May 2025. Applications received after the last date will not be considered.

#### **General Information:**

- Those who are already working in Government/Semi Government/PSU/Autonomous Bodies shall submit their applications through proper channel.
- The Institute reserves the right to restrict the number of candidates for interview to a reasonable limit, on the basis of qualification and experience higher than the minimum prescribed in the advertisement. Mere fulfilling the essential and desired qualifications will not entitle an applicant to be called for interview.
- Age relaxation will be applicable as per Govt., of India rules for the candidates belonging to SC/ST/OBC/Persons with disabilities categories.
- Second Class AC train fare for attending interview shall be reimbursed to the candidate on provision of original tickets.
- This is a project-based position. Remuneration shall depend on availability of project funding.
- The institute reserves the right to relax any of the above requirements in exceptional cases.
- The Institute reserves the right not to fill the posts herein advertised. Canvassing in any form shall disqualify the candidate.