1 Advertisement

**Post Title:** Research Fellow in Quantum Networking and Quantum Computation  
**School/department:** School of Mathematical and Physical Sciences  
**Hours:** Full time or part time hours considered up to a maximum of 1FTE. Requests for flexible working options will be considered (subject to business need). For further details regarding flexible working please follow this link - flexible-working.  
**Contract:** fixed term until November 2022  
**Reference:** 2002  
**Salary:** starting at £33,199 and rising to £39,609 per annum  
**Closing date:** 23 September 2019. Applications must be received by midnight of the closing date.  
**Expected Interview date:** week commencing 07 October 2019 TBC  
**Expected start date:** 02 December 2019

Applications are invited for a full-time postdoctoral position in quantum networking and quantum computing at the University of Sussex. Applicants should have obtained a PhD in experimental quantum optics, laser- or atomic physics and be able to demonstrate working knowledge in this field.

The appointment is within the framework of the UKRI EPSRC Hub in Quantum Computing and Simulation. The successful candidate will work in a team of experienced researchers directed by Prof Matthias Keller.

The goal of the project is to combine two of the most successful techniques in quantum information processing, individually trapped ions and strong-coupling cavity-QED, and use them as tools to set up a distributed quantum network.

The principal challenge in the implementation of this scheme is the requirement for miniature-size traps and microscopic optical cavities to provide suitable conditions for a high-fidelity interface between ions and photons.

In the project, technologies are developed to demonstrate distributed quantum information processing in a model system. This includes novel ion traps, laser sources and high-finesse optical cavities.

For further information please contact Prof Matthias Keller:  
Phone: +44 (1273) 877673, email: M.K.Keller@sussex.ac.uk

Please attach a CV, at least two references and a list of relevant publications to your application.

The University of Sussex values the diversity of its staff and students and we welcome applicants from all backgrounds.
2. The School / Division

Please find further information regarding the school/division at http://www.sussex.ac.uk/physics/

3. Job Description

Job Description for the post of: Research Fellow in Quantum Networking and Quantum Computation

Department: Physics and Astronomy
Section/Unit/School: MPS
Location: Pevensey 2
Grade: 7
Responsible to: Prof Matthias Keller

Responsible for:

PRINCIPAL ACCOUNTABILITIES
1. To engage in individual and/or collaborative research activity resulting in high-quality publications; and to develop research funding and knowledge exchange income individually or in collaboration with others, as appropriate, depending on the size and scope of the bid.
2. To contribute to School teaching activities.

KEY RESPONSIBILITIES
1. Research, Scholarship & Enterprise
   1.1 Develop research objectives and proposals for own or joint research, at acceptable levels, with assistance if required.
   1.2 Conduct research projects individually and in collaboration with others.
   1.3 Analyse and interpret research findings and draw conclusions on the outcomes.
   1.4 Produce high-quality research outputs for publication in monographs or recognised high-quality journals, or performance/exhibition, as appropriate, and contribute to the School's REF submission at acceptable levels of volume and academic excellence.
   1.5 Contribute to the preparation of proposals and applications to external bodies, for example for funding purposes.
   1.6 Individually or with colleagues, explore opportunities for enterprise activity, knowledge exchange income and/or consultancy, where permissible.
   1.7 Build internal contacts and participate in internal networks and relevant external networks in order to form relationships and collaborations.
   1.8 Continually update knowledge and understanding in field or specialism, and engage in continuous professional development.

2. Teaching & Student Support
   2.1 Undertake teaching duties, if required.
   2.2 Assist in the assessment of student knowledge and supervision of student projects if required.
   2.3 Assist in the development of student research skills, for example as part of a
postgraduate supervision team.

3. Contribution to School & University
   3.1 Attend and contribute to relevant School and project meetings.
   3.2 Undertake additional duties, as required by the Principal Investigator and/or Head of School.

4. Role-specific duties
   4.1 Planning, building and setting up a miniature ion trap and a miniature optical cavity for experiments with ions and photons.
   4.2 This involves working with stable high-finesse optical cavities with small mode volume, using novel techniques such as optical fibre cavities. Diode-laser systems will be used for coherently manipulating the electronic states of calcium ions.
   4.3 Conducting research on ion-trap cavity-QED as an interface for quantum states of single ions and single photons. Important goals are the efficient generation of indistinguishable single photons on demand and the state-selective readout of the electronic state of calcium ions. This will be used for the investigation of ion-photon entanglement and ion-ion-entanglement, and finally the transmission of quantum states between distant cavities.
   4.4 Dissemination of research findings through conference presentations and articles in journals.

This Job Description sets out current duties of the post that may vary from time to time without changing the general character of the post or level of responsibility entailed.

INDICATIVE PERFORMANCE CRITERIA
1. Publishing research (either from a recently completed PhD or new original research).
2. Other forms of externally recognised professional practice of creative output of a standing equivalent to regular publication of original research.
3. Initiating, developing or participating in links between the University and external bodies such as business and industry, the professions, community organisations and policy-makers.
4. Evidence of successful engagement in teaching or supervision.

4. Person Specification

ESSENTIAL CRITERIA
1. Normally educated to doctoral level, or other equivalent qualification, or appropriate level of experience, as appropriate to the discipline (see role-specific criteria below).
2. Evidence of engagement in high-quality research activity.
3. Excellent presentation skills, with the ability to communicate effectively, both orally and in writing, with students, colleagues and external audiences.
4. Ability to work individually on own initiative and without close supervision, and as part of a team.
5. Ability to exercise a degree of innovation and creative problem-solving.
6. Excellent organisational and administrative skills.
7. Ability to prioritise and meet deadlines.
8. Excellent IT skills.

ESSENTIAL ROLE-SPECIFIC CRITERIA
1. PhD in experimental quantum optics, laser- or atomic physics.
2. An up to date working knowledge in the field of experimental quantum optics, laser- or atomic physics
3. Skills in working with optics and lasers.
4. Competence in using data acquisition software (LabView) and data analysis software.
5. Good communication skills, written and oral.
6. Experience in experiments in atomic or ion physics.
7. Experience in handling of ultra-high vacuum equipment.

DESIRABLE CRITERIA
1. Emerging track record of high-quality publications in reputable journals and other appropriate media of similar standing.
2. Experience of generating research or knowledge exchange income.
3. Solid knowledge of quantum optics.
4. Experience in laser-manipulation of neutral atoms or ions.
5. Experience in working with ultra-high finesse optical resonators.

The University is committed to equality and valuing diversity, and applications are particularly welcomed from women and black and minority ethnic candidates, who are under-represented in academic posts in Science, Technology, Engineering, Medicine and Mathematics (STEMM) at Sussex.