

Basic Detail

Supervisor	Margherita Mazzera
Institute	Heriot-Watt University
Proposed Start Date	January 2021
Duration of Contract	The PhD project is available for 3.5 years for UK or EU nationals. This funding includes a stipend of £15k per year.
Post Name	PhD Position for UK or EU nationals - NOVEL PLATFORMS FOR INTEGRATED QUANTUM DEVICES BASED ON RARE EARTH DOPED INSULATING MATERIALS

Detailed Description

We offer a PhD position (for UK or EU nationals) for a talented, proactive, and strongly motivated candidate who will contribute building a new setup with potential for ground breaking scientific research in the field of solid-state quantum memories for quantum communication applications.

This project aims at the development of new platforms for integrated quantum devices based on rare earth ion doped materials. This will involve the investigation of the mechanisms affecting the optical and spin coherence properties of new materials and the implementation of storage protocols.

The field of coherent information processing with rare earth ion doped solids has experienced in the last two decades a very exciting and promising development, and the present project opens the possibility to work in close contact and friendly collaboration with the most important and prolific international research groups active in this field. Additionally, the outlined work-plan will allow developing numerous hands-on skills as optical spectroscopy, light manipulation and characterisation, quantum and non-linear optics, vacuum, cryogenics and photon counting techniques.

The research will be carried under the supervision of Dr Margherita Mazzera.

Applicants must have or expect to have a first-class degree or equivalent in physics, or other relevant subject in the physical sciences. A background in experimental physics is desirable.

To apply, please send your CV, academic transcripts and a cover letter explaining your motivation/interest in this project, to Dr. Margherita Mazzera (m.mazzera@hw.ac.uk).

The **Quantum Photonics Laboratory** at Heriot-Watt University (HWU) is engaged in research covering solid-state photonics, engineering coherent light-matter interaction using quantum structures and devices, and exploiting such devices for quantum technologies. The group consists of about 15 members, including three academics: Dr Margherita Mazzera, Dr Cristian Bonato and Prof. Brian Gerardot. The quantum photonic platforms used within the group includes rare-earth doped crystals, defects in wide band-gap materials such as SiC or diamond, two-dimensional materials 'beyond graphene', quantum dots in III-V semiconductors. The group has well-equipped laboratories for quantum optics and high-resolution laser spectroscopy of quantum emitters at room and cryogenic temperatures, radio-frequency control of electronic/nuclear spins as well the facilities for fabrication of novel optoelectronic / quantum photonic devices. The group collaborates with several research groups both academic and industrial, within HWU, the UK, and internationally.

Basic Detail

Supervisor	Margherita Mazzera
Institute	Heriot-Watt University
Proposed Start Date	January 2021
Duration of Contract (months)	24
Post Name	Post-doctoral Research Associate in “Telecom quantum memory for Quantum Repeaters Using On-demand Photonic Entanglement”

Detailed Description

The Quantum Photonics Laboratory seeks a talented and motivated scientist to undertake research on quantum technology with rare-earth doped crystals for quantum memory applications. Significant goals include the characterization of the optical/spin properties of different crystals, optimization of their electronic and spin coherence; the implementation of broadband quantum memory protocols at telecom wavelength. The project is expected to lead to high impact scientific publications and to technological developments related to integrated quantum photonic devices for quantum networking. The work will be conducted in the framework of a recently funded European project on Quantum Repeaters involving world leading groups in quantum photonics and quantum communication and will be carried out under the supervision of Dr Margherita Mazzera, who is principal investigator for Heriot-Watt University within the European project.

For more information, please send enquiry emails to Dr Margherita Mazzera (m.mazzera@hw.ac.uk).

The application requires a CV, a cover letter explaining the motivation/interest in this project, and the names and contacts of two referees.

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Essential Criteria

- A PhD in physics, electrical engineering, or related subjects. Candidates must have submitted their doctoral thesis before starting in post.
- The ideal candidate will have a strong theoretical understanding and an experimental background in one or more of the following fields: solid-state physics, quantum photonics, and quantum information science.
- Previous experience with one or more of the following:
 - Vacuum and cryogenics technology
 - Laser stabilisation
- A demonstrated track-record (during a PhD degree or post-doctoral research) of:
 - Control and measurement of quantum systems
 - Optical and/or radio-frequency technology

- Experience of programming for data acquisition and analysis.
- A record of high-quality publications, as appropriate for the stage in career.
- Ability to articulate research work, both in technical reports / papers and by oral presentation
- Ability to formulate and progress work on their own initiative
- Must be able to work as part of a team on the experiments at Heriot-Watt and more widely with the collaborators at other Universities

Desirable Criteria

- Experience in leading the writing of scientific papers.
- Evidence of ability, subject to opportunity, to guide other researchers, e.g. PhD students and undergraduate project students.