SENIOR RESEARCH ASSOCIATE IN SUPERCONDUCTING QUANTUM
DEVICES FOR DARK MATTER EXPERIMENTS
JOB DESCRIPTION

Job vacancy: A3278

<table>
<thead>
<tr>
<th>Job Title: Senior Research Associate</th>
<th>Present Grade: 7</th>
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<td>Department/College: Physics</td>
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<td>Directly responsible to: Prof Yuri Pashkin, Dr Ian Bailey and Dr Edward Laird</td>
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<td>Supervisory responsibility for: partial responsibility for graduate and MPhys students</td>
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Other contacts
Internal: members of the Physics Department
External: STFC QSHS project partners, professional bodies, academic and research networks

The post will support the activities of Lancaster University within the STFC QSHS project. This is a joint project involving groups from Sheffield (lead), Cambridge, NPL, Liverpool, Oxford, Royal Holloway and Sussex. The goal of the project is to build a world-leading experimental effort in the UK centred around the development of a dark matter axion haloscope. Lancaster will contribute to the development of ultrasensitive superconducting quantum electronic devices that will be part of the front-end measurement instrumentation. In particular, we aim to develop a broadband, high-gain Josephson parametric amplifier that can be integrated into the dark matter detector.

The project will be undertaken in the Physics Department of Lancaster University and is experimental in nature. The post holder will design, fabricate and characterise amplifiers optimized for a haloscope experiment. An essential part of the project will be device fabrication using state-of-the-art nanofabrication facilities available in the Lancaster Quantum Technology Centre cleanroom. Device characterisation will be performed in cryogen-free dilution refrigerators equipped with microwave measurement lines and cold amplifiers. The post-holder will work in the Physics Department, but travel to project partners is to be expected.

Major Duties:

- Play a leading role in the Lancaster effort to develop a Josephson travelling-wave parametric amplifier by designing, fabricating and testing amplifiers suitable for use in a haloscope;
- Ensure that the scientific objectives of the QSHS project are achieved;
- Ensure that deliverables are produced according to schedule;
- Write technical documents to capture results and publish papers in peer-reviewed journals;
- Disseminate project results including presenting to project partners and at conferences;
- Support Lancaster PhD students and other members of the Quantum Nanotechnology and Ultra-Low Temperature groups