



UNIVERSITY OF LEEDS

CANDIDATE BRIEF

**Research Fellow in Topological Quantum Computation,
Faculty of Engineering and Physical Sciences**



Salary: Grade 7 (£41,064 – £48,822 p.a.) Due to funding restrictions, an appointment will not be made higher than £43,482 p.a.

Reporting to: Professor Jiannis Pachos

Reference: EPSPA1131

Closing date: Wednesday 17 December 2025

Fixed-term (for 3 months - to complete specific time limited work)

Location: Leeds Main Campus

We are open to discussing flexible working arrangements

Research Fellow in Topological Quantum Computation, School of Physics and Astronomy.

Are you a researcher looking for your first challenge? Do you have a background in topological quantum computation? Do you want to further your career in one of the UK's leading research-intensive universities?

Overview of the Role

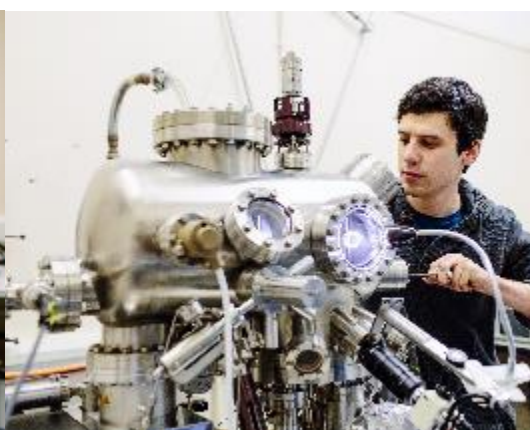
You will work on the theory and simulation of topological quantum computation using non-Abelian anyons, with a focus on the $D(S_3)$ quantum double model. This project develops and validates a minimal two-qudit protocol for generating magic states through braiding, providing a fault-tolerant route to universal quantum computation.

You will join the Quantum Group at the University of Leeds and collaborate with experimental teams working on superconducting qubits and photonic platforms. Your role will involve advancing the theoretical framework, performing numerical simulations, and supporting experimental implementation.

We are looking for a motivated early-career researcher with a background in quantum information theory, quantum computing, or topological phases of matter, and an interest in bridging theory and experiment.

Main duties and responsibilities

- Developing and analysing protocols for generating and manipulating magic states via braiding in the $D(S_3)$ quantum double model;
- Simulating fusion and braiding operations using tensor networks or quantum circuit models to support experimental implementation on superconducting and photonic platforms;
- Generating and pursuing independent and original research ideas in the appropriate subject area;
- Developing research objectives and proposals and contributing to setting the direction of the research project and team including preparing proposals for funding in collaboration with colleagues;



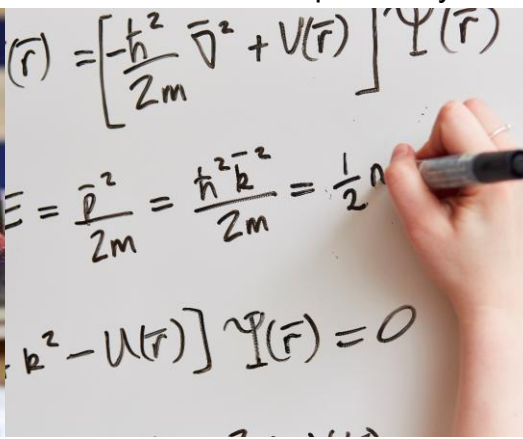
- Evaluating methods and techniques used and results obtained by other researchers and to relate such evaluations appropriately to your own research;
- Making a significant contribution to the dissemination of research results by publication in leading peer-reviewed journals and by presentation at national and international meetings;
- Working independently and as part of a larger team of researchers, both internally and externally, to develop new research links and collaborations and engage in knowledge transfer activities where appropriate;
- Maintaining your own continuing professional development and acting as a mentor to less experienced colleagues as appropriate;
- Contributing to the training of both undergraduate and postgraduate students, including assisting with the supervision of projects in areas relevant to the project.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.

Qualifications and skills

Essential

- A PhD (or have submitted your thesis before taking up the role) in quantum information, quantum computing, theoretical condensed matter physics, or a closely related discipline;
- A strong background in topological quantum computation, anyon models, or quantum error correction;
- Experience working with algebraic or lattice models of topological order, such as quantum doubles or fusion categories;
- Proficiency in symbolic and/or numerical computation tools (e.g., Python, Mathematica, MATLAB, or tensor network libraries);
- Good time management and planning skills, with the ability to meet tight deadlines and manage competing demands effectively without close support;
- A developing track record of peer-reviewed publications in international journals;
- Excellent communication skills both written and verbal, and the ability to communicate your research at national and international conferences;
- A proven ability to work well both independently and in a team;



- A strong commitment to your own continuous professional development.

Desirable

- Experience of pursuing external funding to support research;
- Familiarity with Clifford and non-Clifford gate constructions and their relevance to universal quantum computation.

How to apply

You can apply for this role online; more guidance can be found on our [How to Apply](#) information page. Applications should be submitted by **23:59** (UK time) on the advertised [closing date](#).

Contact information

To explore the post further or for any queries you may have, please contact:

[Professor Jiannis Pachos](#), Professor

Tel: +44 (0)113 343 3817

Email: J.K.Pachos@leeds.ac.uk

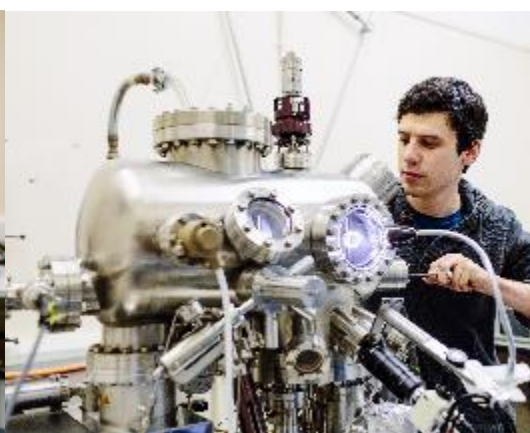
Additional information

Faculty and School Information

Further information is available on the research and teaching activities of the [Faculty of Engineering & Physical Sciences](#), and the School of [Physics and Astronomy](#).

Working at Leeds

We are a campus-based community and regular interaction with campus is an expectation of all roles in line with academic and service needs and the requirements of the role. We are also open to discussing flexible working arrangements. To find out more about the benefits of working at the University and what it is like to live and work in the Leeds area visit our [Working at Leeds](#) information page.



A diverse workforce

As an international research-intensive university, we welcome students and staff from all walks of life and from across the world. We foster an inclusive environment where all can flourish and prosper, and we are proud of our strong commitment to student education. Within the Faculty of Engineering and Physical Sciences we are dedicated to diversifying our community and we welcome the unique contributions that individuals can bring, and particularly encourage applications from, but not limited to Black, Asian and ethnically diverse people; people who identify as LGBT+; and people with disabilities. Candidates will always be selected based on merit and ability.

The Faculty of Engineering and Physical Sciences are proud to have been awarded the Athena SWAN [Silver](#) Award from the Equality Challenge Unit, the national body that promotes equality in the higher education sector. Our [equality and inclusion webpage](#) provides more information.

Information for disabled candidates

Information for disabled candidates, impairments or health conditions, including requesting alternative formats, can be found under the 'Accessibility' heading on our [How to Apply](#) information page or by getting in touch by emailing HR via hr@leeds.ac.uk.

Criminal Record Information

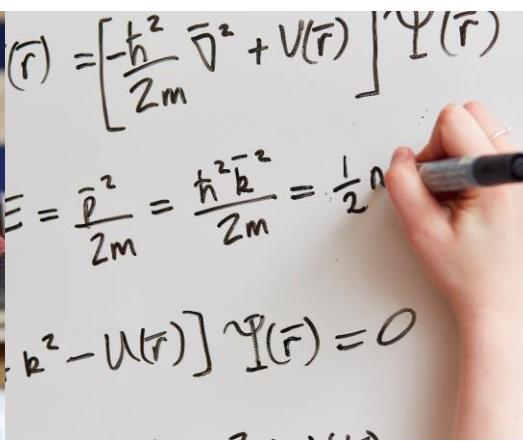
Rehabilitation of Offenders Act 1974

A criminal record check is not required for this position. However, all applicants will be required to declare if they have any 'unspent' criminal offences, including those pending.

Any offer of appointment will be in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our [Criminal Records](#) information page.

Salary Requirements of the Skilled Worker Visa Route

Please note that this post may be suitable for sponsorship under the Skilled Worker visa route but first-time applicants might need to qualify for salary concessions. For more information, please visit [the Government's Skilled Worker visa page](#).



For research and academic posts, we will consider eligibility under the Global Talent visa. For more information, please visit [the Government's page, Apply for the Global Talent visa.](#)

