School of Science, Department of Physics

Loughborough University

Research Associate in Theoretical and Computational Condensed Matter Physics

REQ210434

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

Department summary

The Physics Department at Loughborough University has a vibrant community of scholars who are committed in supporting each other to deliver outstanding research. We have a well-established internationally renowned research in Condensed Matter Physics and novel quantum materials, including theoretical, computational and experimental in a wide range of topics. The department has a high international profile and staff members collaborate with the top physicists in the world.

Loughborough University holds the Athena SWAN Bronze award, recognising its commitment to improving the representation and career progression of women in STEM (science, technology, engineering and mathematics) subjects. The Department of Physics is committed to creating a diverse and inclusive culture in which staff and students are able to thrive, regardless of their gender.

Job Description

Applications are invited for a post-doctoral research associate to start on the 1st of September 2021 or as soon as possible thereafter. The successful applicant will be based in the Department of Physics at Loughborough University and will work in the area of quantum magnetism and spin liquids, and in particular on the project, funded by EPSRC, "Detecting fractionalization in strongly correlated magnets".

You will find exciting opportunities for research and collaborations within the group as well as with a wider network of world-leading partners from UK, USA and Germany.

Job Grade: Specialist and Supporting Academic, Grade 6

Job Purpose

The aim of the project is to develop and apply quantitative diagnostic tools for the unambiguous detection of spin liquids and fractionalization in rear materials, using novel numerical and semi-analytical many-body platforms. The results will help to establish the distinctive fingerprints of fractionalization in realistic non-integrable models and unravel the microscopic organising principles of candidate materials that are currently actively pursued in the field.

Job Duties

- To carry out original research.
- To develop computational and analytical many-body techniques, such as: large-scale exact diagonalizations, tensor networks, quantum Monte Carlo, and interacting semiclassical spin-wave expansions and multi-boson generalizations thereof.
- To apply said techniques for the study of dynamical fingerprints of spin liquids in non-integrable models and real materials of current interest.
- To publish original research in leading international journals.
- To disseminate research via seminars, national meetings and international conferences.

- To actively participate in the various academic activities of the group (such as research group meetings and journal clubs).
- To work closely with the research fellows and students of the group in joint research work.
- To collaborate with UK and international research partners (this is likely to involve international travel on several occasions during the period of the appointment).

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed.

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equality & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equality & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Reports to the Principal Investigator.

Person Specification

Your application will be reviewed against the essential and desirable criteria listed below. Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. Stages of assessment are as follows:

1 – Application
2 – Test/Assessment Centre/Presentation
3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	Experience in modern computational many-body techniques, such as exact diagonalizations, tensor networks and quantum Monte Carlo.	1,3
	Experience in analytical many-body techniques, such as semiclassical spin-wave and multiboson expansions, and coupled-cluster theory.	1,3
	Evidence of originality and independence	1,3
	Evidence of working well as part of a group	1,3
	Publications in international journals	1,3
Skills and abilities	High attention to detail	3
	Excellent written and oral communication skills in English	1,3
	Teamwork skills	1,3
	Excellent time management skills	3
	Collaboration with experimental groups	1,3
	Computational skills	1,3
Training	Willingness to undertake appropriate further training and to adopt new procedures as and when required	3
Qualifications	PhD or equivalent in Condensed Matter Physics	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	3

Desirable Criteria

Area	Criteria	Stage
Experience	Large-scale computational many-body techniques	1,3
	Analytical many-body techniques	1,3
Skills and abilities	Leadership skills and desire for a research career in Physics	3
Qualifications	PhD or equivalent in Condensed Matter Physics	1

Conditions of Service

The position is full time and fixed term for 2 years. Salary will be on Specialist and Supporting Academic Grade 6, £30,942 to £40,322 per annum, at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Grade 6 and above staff, details of which can be found here.

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which are available at http://www.lboro.ac.uk/services/hr/a-z/family-leave-policy-and-procedure---page.html.

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html

In addition, the University is supportive, wherever possible, of flexible working arrangements.
We also strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see http://www.lboro.ac.uk/services/hr/athena-swan/