Joint PhD studentship between the University of Edinburgh and the Institut Laue-Langevin (Grenoble)

Project: Applications are invited for a 3.0-year PhD studentship within the School of Physics and Astronomy at the University of Edinburgh and the Institut Laue-Langevin (ILL) under the supervision of Dr Elton Santos (on the UK side), and Dr Nina-Juliane Steinke (on the France side). The project liaises state-of-the-art modelling and experimental techniques to investigate quantum magnetic materials for energy-efficient processes and novel data storage technologies. In particular, on advanced approaches on the electronic, and magnetic properties of layered compounds. The successful candidate will investigate novel pathways for the implementation of the next generation of compounds for integration in information communication technologies. The project will cover theory (Edinburgh) and experimental methods (ILL) which will be learnt throughout the project. The research will cover method developments and application of established techniques to challenging problems in materials technology. The student will master several concepts on the physics of magnetic materials, their importance for technology, and possible solutions to open-problems in the real-world such as clean-energy and environment friendly devices. The successful candidate will work closely with other PhDs and postdocs involved in similar investigations. Keenness to learn experimental and modelling techniques is a plus.

Qualifications and skills: Previous experience is required on some of the following

- Open-source ab initio codes (e.g., KKR, VASP, Quantum-Espresso, etc.).
- Coding languages (e.g., Fortran, C/C++, Python, etc.)
- Previous lab experience, especially in scattering or magnetometry
- Monte Carlo and micromagnetic techniques
- Numerical and analytical approaches (e.g., spin Hamiltonians)

Modelling part: The successful candidate will develop several computational skills in terms of first-principles methods (e.g., strongly correlated systems), Monte Carlo, Landau-Lifshitz-Gilbert equation techniques, and data-driven approaches (e.g., high-throughput, databases). Both method development and utilisation of in-house codes will be undertaken during the project. Hence, the student should have a strong background in the characteristics above. Access to computational world-class facilities via ARCHER2 and Cirrus UK National HPC Service at EPCC funded by the University of Edinburgh/EPSRC will be available.

Experimental part: The project will be developed in partnership with ILL in Grenoble, a world-class neutron scattering facility. The neutron experiments and lab charcterisations will complement and validate the theoretical approaches. It is expected that the candidate will expend visits and long stays in ILL in France for experimental training, measurements and analysis. However, the distribution of the stays is flexible within an overall 50-50% time sharing.

Eligibility: Students are expected to hold a first-class Hons degree, or equivalent, in physics, chemistry or a related discipline. A Master's degree in one of the above fields/techniques would be advantageous together with previous publications in scientific journals. There are no restrictions on nationality.

How to apply: Interested applicants should use the following link including: 1) up-to-date CV, including publication list; 2) a letter of motivation; and 3) the names and contact details of three academic referees.

Informal queries to Dr Elton Santos (esantos@ed.ac.uk) or Dr Nina-Juliane Steinke (steinkenj@ill.fr). **Closing date:** 15th August 2025