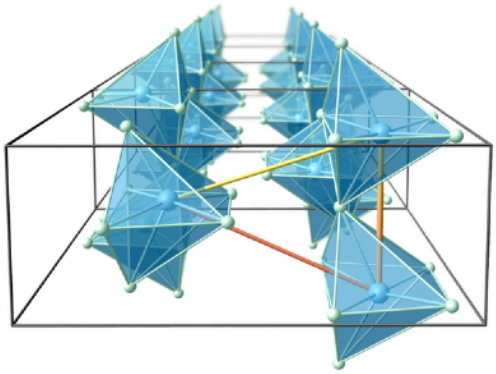
PhD thesis project

Coupling strain with magnetism in complex orbitally-driven phase transitions



Aim

The aim of this project is to discover tuneable means of coupling strain and magnetism, a phenomena known as piezomagnetism. This will allow one to induce and control spontaneous magnetic moments by applying a mechanical stress or conversely to bring about a strain through application of a magnetic field in a material. Spin-orbit coupling provides a direct link between structural strain and spin magnetism while also providing routes towards new magnetic ground states such as spin-liquids that are predicted to be important for error correction in new computing. Third-row transition metal ions display complex orbital properties with an energy scale that is comparable to spin-exchange and distortion terms in the elastic properties. The hypothesis of this project is that oxide compounds containing metal ions like cobalt and iron provide ideal materials for the coupling between spin and orbital properties at relevant temperature scales while being amenable for the study with neutron diffraction and spectroscopy.

Methods

This project will investigate the structural and magnetic properties of a series of 3*d* transition metal oxide compounds. Elastic strain will be investigated through application of neutron spectroscopy to study low-energy acoustic lattice instabilities. This will be complemented by single crystal and powder neutron/x-ray diffraction applying facilities at the Institut Laue-Langevin and also the University of Edinburgh.

You have a master or diploma in Physics or equivalent? You are interested in experimental work on material properties of the future? You are excited to work in an international environment at large-scale facilites?

Then this project could be interesting for you!
Feel free to contact us for more information!

When:	open now
Where:	School of Physics and Astronomy at the University of Edinburgh & Institut Laue-Langevin
Duration:	4 years
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