

PhD Position: Long-lived quantum states in magnetic systems

Supervisor: Dr Ilya Kuprov

The primary difficulty in large-scale quantum device engineering is the fragile nature of quantum states – left on their own, they fade away or get destroyed by thermal fluctuations of their environment. This project is about finding quantum states that do not fade. It is known that such states exist and a few examples are available, but a large-scale search for them has not so far been attempted due to the tremendous amount of computational resources required for such a search.

This project will use one of the biggest supercomputers in the UK to run a brute-force search for long-lived quantum states in experimentally accessible spin systems. A survey of commercially available molecules with large decoherence-free subspaces will be carried out, new chemical structures proposed the resulting molecules will be used to facilitate NMR, MRI and DNP experiments and build more resilient quantum devices.

This project is a part of the iMR CDT Doctoral Training Programme that provides high-level training courses, industry internship opportunities, conference and collaboration travel funds, high-performance workstations as well as research networking opportunities within the six participating UK universities.

Further information on this project is available at <http://spindynamics.org>

For further information about applying contact Ilya Kuprov (i.kuprov@soton.ac.uk) or iMR.CDT@warwick.ac.uk.

The Centre for Doctoral Training in Integrated Magnetic Resonance is a collaboration between researchers at the Universities of Warwick, St Andrews, Dundee, Southampton, Aberdeen and Nottingham.