PhD Position: Phonon engineered qubit experiments for many-body entanglement on demand

A computer based on quantum information would be able to solve certain problems which are intractable with other types of computer. The longest qubit coherence times have been measured using dopant atoms in silicon where the spin T2 time can reach hours. It is natural to use the spin of an electron as a quantum bit because spin down is '0', spin up is '1', and all possible superposition states can be accessed with magnetic resonance. High magnetic fields can be used to polarize the spin qubits, initializing them for a computation, and are needed to allow high-fidelity single-qubit measurement.

It is not yet clear how to couple up many such qubits, so we will investigate the idea of using coherent phonons for this crucial step. We will use cutting-edge pulsed electron paramagnetic resonance equipment to do this by systematically measuring the electron spin relaxation times as a function of magnetic field (from 0.3 to 14.1 T), temperature, sample orientation, dopant concentration and dopant species (phosphorous and bismuth dopants).

We are looking for highly motivated people with a strong background in physical sciences, a love of technology and the desire to work in teams. We offer you a lab with extraordinary equipment and the chance to follow up on your own ideas. This fully-funded four-year studentship is part of the Integrated Magnetic Resonance Centre for Doctoral Training (iMR-CDT) that provides high-level training courses, industry internship opportunities, and enhanced travel funds for conferences and collaboration.

For further information about applying contact Gavin Morley (gavin.morley@warwick.ac.uk) or iMR.CDT@warwick.ac.uk.

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