PhD Position: Magnetization storage agents for hyperpolarized MRI

Magnetic resonance imaging (MRI) generates detailed anatomical images of outstanding clinical utility. However, MRI is limited by a weak signal strength caused by the small thermal polarization of the magnetic hydrogen nuclei. Practical hyperpolarization methods have been developed which can enhance the magnetic resonance signals by up to 5 orders of magnitude, but unfortunately, the hyperpolarization effect is short-lived. Our groups are developing long-lived nuclear spin states which can retain hyperpolarization for a much longer time. This effect has been demonstrated in model systems, and could lead to brighter and even more informative MRI scans.

A multidisciplinary team has been assembled, consisting of NMR spectroscopists, synthetic chemists, and quantum theorists, together with state-of-the-art computational infrastructure and MRI test equipment funded by the European Research Council and UK research councils.

Your part in this project will be to use quantum theory and numerical calculations to explore the decay mechanisms of long-lived nuclear spin states and to help develop new agents for hyperpolarized MRI. You will have the opportunity to complement your theoretical and numerical work with experimental measurements. The project provides an outstanding opportunity to learn the latest spectroscopic and computational methods as part of an exciting interdisciplinary collaboration on the cutting edge of imaging technology.

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