

## **PhD Position: Novel Polarising agents for photo-chemically induced nuclear polarization**

Hyperpolarization techniques increasing the NMR sensitivity by orders of magnitude are becoming increasingly important. One main drawback of NMR spectroscopy is its intrinsically low sensitivity arising from the very small Boltzmann polarisation of nuclear spin states even at very high magnetic fields. Hyperpolarization techniques are used to overcome this by partly transferring the 600-fold higher Boltzmann polarization of added stable radical electron spins or even utilizing the spin order of one, generated by light induced radical pairs. Photo-chemically induced nuclear polarisation (photo-CIDNP) has been shown to yield a signal enhancement by four orders of magnitude in natural photosynthetic reaction centres at medium NMR fields.

In collaboration with groups from the University of Bielefeld, the University of Leipzig and the ETH Zürich we are designing artificial donor-acceptor dyads for the use as polarizers in solid state photo-CIDNP. In a first stage the EPR properties will be characterized pursuing the ultimate goal of optimizing the systems as well as the polarization transfer to nuclei.

The project will be carried out utilizing pulsed laser excitation in a state-of-the-art high field EPR spectrometer developed under the UK Basic Technology Program operating at power levels 3000 times greater than equivalent commercial systems. The successful candidate will join the pulsed EPR group based at the St Andrews Magnetic Resonance Centre, which includes collaborators from Physics, Chemistry and Lifescience at St Andrews and Dundee Universities. Research within the group focuses on many aspects of pulse EPR spectroscopy including a large range of biophysical projects related to nanometre distance measurements and on optical hyperpolarization.

This collaborative project will also be strongly linked with the Universities of Bielefeld, Leipzig and the ETH Zürich.

For further information about applying contact Bela Bode ([beb2@st-andrews.ac.uk](mailto:beb2@st-andrews.ac.uk)) or [iMR.CDT@warwick.ac.uk](mailto: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, Southampton, Aberdeen and Nottingham.