

## About Spin@RT

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Spin@RT is a £2.3M initiative, funded by the EPSRC, that aims to develop new electronic concepts and devices based on the quantum magnetic property of the electron known as spin. This field of research is known as 'Spintronics', and has the aim of using the electron spin to play the role in the storage and processing of information that is currently played by charge in conventional microelectronics. The technology relies on the generation, manipulation and detection of spin-polarised currents, which requires the devices to be constructed from magnetic materials, rather than conventional semiconductors such as silicon. Since the spins must be maintained in a coherent quantum state during this process individual components must be smaller than a critical length scale over which spin information is lost, typically only a few tens of nanometres. The devices, and the materials from which they must be built, must therefore be engineered with atomic precision. Basic spintronic devices have revolutionised the hard disk industry, acting as the extremely sensitive magnetic detectors required to play back the data recorded on the type of ultra-high density disk drives used in iPods and servers. Non-volatile memory devices based on spin are close to commercialisation, which would remove the need to reboot a computer every time it is switched off. Further in the future, spin-based logic devices are envisaged, which can be reconfigured to perform multiple logic functions, allowing novel 'chameleon processor' architectures to be built. If the extreme case of operating on single spins is achieved, spintronics will be an excellent candidate architecture for building a quantum computer.