

Physics research talks 2017-18

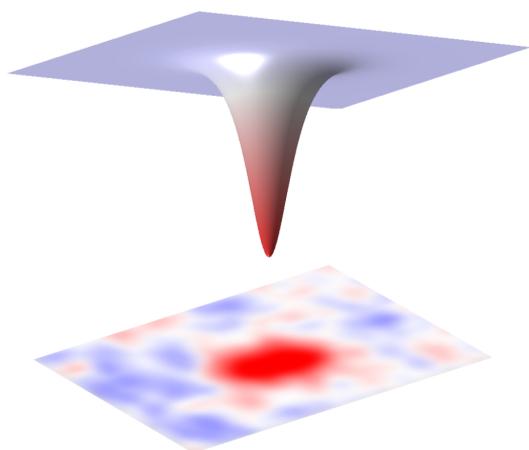
Ever wondered what goes on behind the lab doors? Come and find out!

Dirk Backes

Advances in Spintronics

From today's magnetic hard disk to future topological spintronic devices

Wed 6 Dec, 16.00, U0.05 — all welcome



In this talk, I outline how the progress in nanofabrication and magnetic thin film deposition techniques, as well as the discovery of new materials, are driving advances in spintronics, the field of research concerned with employing the spin of electrons to store and process information. Starting with the well-known magnetic hard disk, we will embark on a journey towards future spintronic-based

technologies. The most promising candidate to replace the hard disk is magnetic random access memory (MRAM) and a more refined variation, the spin-transfer torque MRAM (STT-MRAM). Borrowing many components of the STT-MRAM, the spin-torque nano oscillator (STNO) generates Gigahertz frequency signals and could find its use in future near field communication. Lastly, I will introduce topological insulators (TI), unique materials which could act as strong spin-sources, with exciting possibilities for spintronic applications.

The intended learning outcome of the talk is to understand that spintronics is at a unique cross section between real-world application and fundamental research. The main innovators are both multinational companies and university research groups, where discoveries can be the result of benchtop experiments as well as experiments in large research facilities, such as synchrotrons. The talk will be based on my past and present research projects and will provide an excellent overview over future research activities in my new group here in Loughborough.

Figure: Magnetic droplet of 170 nanometers in diameter. It is a new magnetic state generated by and observed in STNO devices, using synchrotron radiation.

Next week: Kelly Morrison, *When a lab just won't cut it: Experiments in a Beamline* 14.00, Wed 13 Dec, U0.05
Please let John Samson know if you would like to offer a talk next semester.