Experimental magnetodynamics/quantum transport

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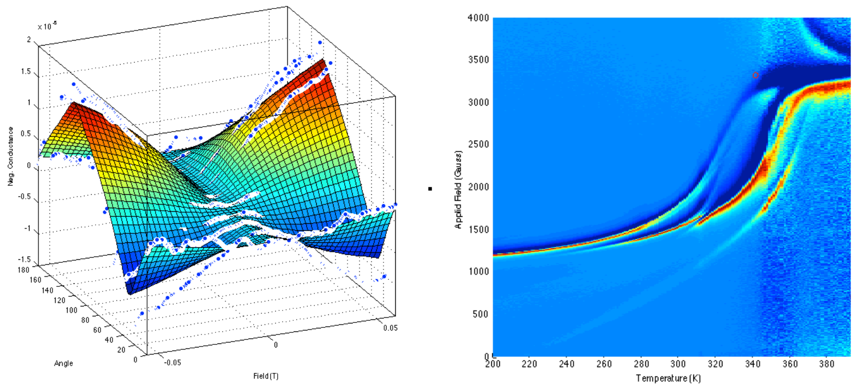
A short introduction:

The research of the experimental magnetodynamics/quantum transport group is focused on understanding the interplay between magnetisation, spin and charge currents at the nanoscale. We utilize ferromagnetic resonance (FMR) spectroscopy to understand how material, structure and charge/spin currents between different materials affect the magnetodynamic properties. We also utilize point contact spectroscopy for energy dependent studies of quantum interference effects such as weak localisation, weak anti localisation and universal conductance fluctuations (quantum transport properties).



Examples of research: Left: magnetoconductance of a point contact to graphite as function of angle, Right: Changes in the FMR induced adsorption of a magnonic film with change of perturbing potential (which scales with temperature)

Master/Project Assignments:

There is a possibility to make any assignment within the fields described, please come in and discuss!

Examples of assignments are:

- **Magnonic structures**: The magnetodynamic response of a magnetic material can be tuned by control of the magnetic structure, where periodic variations will create magnonic materials. This assignment involves experimental studies of such materials in combination with either synthesis (thin film growth and structuring), or theoretical predictions.
- **Generation and detection of magnetodynamic waves**: Ferromagnetic thin films may be used to carry magnetodynamic waves, in this assignment you will generate and detects such waves and use them to characterise the fundamental transport properties of such waves.
- **Spin pumping at interfaces**: Most interaction in active spintronic devices is made through interaction of a spin current with an interface/material. In this assignment you use a thin ferromagnetic film to induce spin currents to map out the interaction with other thin films, such as ferromagnets, antiferromagnets or superconductors.
- **Interface resistance of low dimensional materials**: In this project the magnetoresistivity of point contacts formed by STM to graphite, nanowires or other low dimensional materials will be characterised. This yields insight into how the quantum scattering process at the interface works and how it couples to the band structure of the material,
- **RF adsorption in core-shell magnetic nanoparticles:** Nanoparticles can be custom made to adsorb RF radiation, for potential use in cancer treatment. To do this efficiently we need to understand and control both the ferromagnetic and antiferromagnetic response to RF radiation. In this project you will correlate detailed structure of the nanoparticles with adsorption measurements in the range 10 KHz-40 GHz.