



Development of High-Field Point Contact Andreev Reflection Methodology

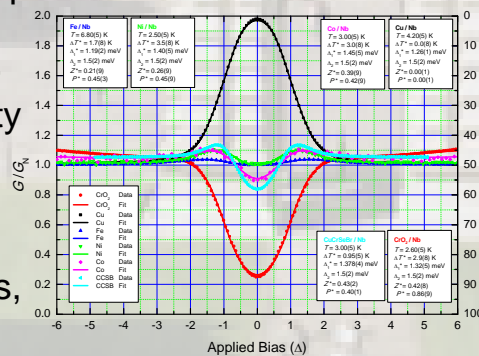
Research supervisor: Dr. Plamen Stamenov
Magnetism & Spin Electronics

Scientific Background / Current Research

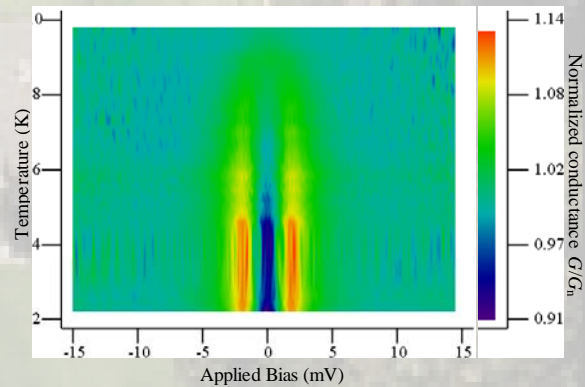
Point Contact Andreev Reflection (PCAR) is a method for determination of the *magnitude of the electron spin polarisation* close to the Fermi level in magnetic metals and degenerate semiconductors – a parameter of *critical importance* for their applications in spin electronic devices. The experiments involve the accurate measurements of the low-temperature differential conductance of *superconductor – metal* junctions and the determination of the characteristic current conversion at the interface (from Cooper pairs to normal quasi-electrons).

Project

The project will involve the construction of a new experimental setup, similar to the one shown on the right, for use in high magnetic fields (up to 14 Tesla); the development of theoretical understanding and modelling (fitting) tools for the experimental observations; and the measurement of spin-polarisation in a variety of novel materials, such as CoPt, FePd, Mn₃Ga, Mn₂Ga, Tm, and Gd, among others, with its sign.



Our "Textbook" examples of PCAR spectra.



Temperature evolution of the PCAR spectrum for bulk polycrystalline thulium. The data is gathered for ~ 1 minute.

Funding

Funding for this project has been approved and is available through the School of Physics, TCD and CRANN program, for a minimum of 4 years. Start immediately or in April 2012.

Contact details

stamenov.plamen@tcd.ie Room no.: CRANN 4.17 tel. +353 1 896 4350
<http://www.tcd.ie/Physics/People/Plamen.Stamenov/Positions>



More information / References

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