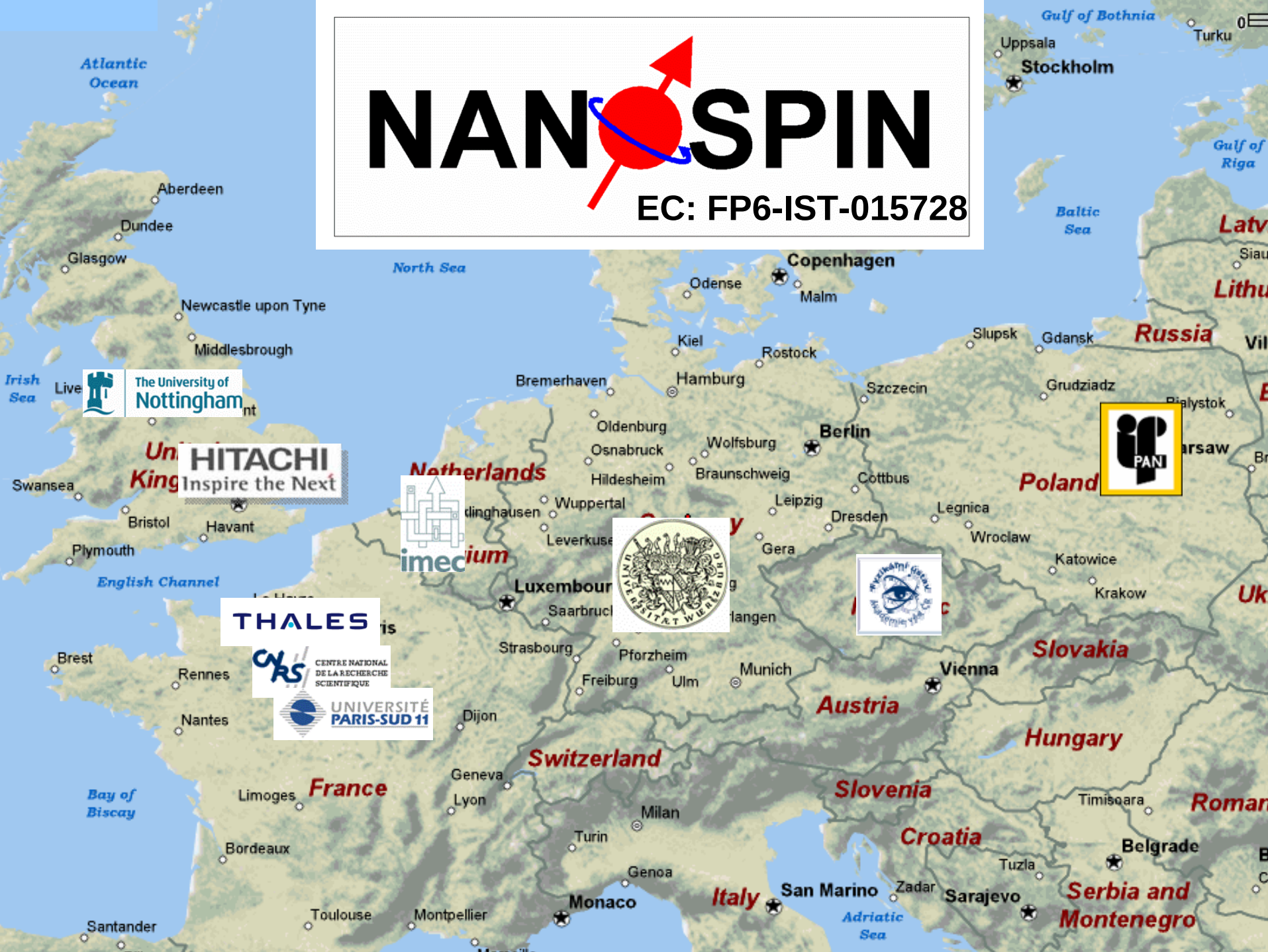
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EC: FP6-IST-015728
The University of Nottingham
HITACHI
Inspire the Next
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THALES
CNRS
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
UNIVERSITÉ PARIS-SUD 11
PAN
Atlantic Ocean
North Sea
Baltic Sea
Gulf of Bothnia
Gulf of Riga
English Channel
Bay of Biscay
Irish Sea
Adriatic Sea
Aberdeen
Dundee
Glasgow
Newcastle upon Tyne
Middlesbrough
Swansea
Bristol
Havant
Plymouth
Brest
Rennes
Nantes
Limoges
Bordeaux
Toulouse
Montpellier
Santander
Dijon
Geneva
Lyon
Marseille
Monaco
Genoa
Turin
Milan
Strasbourg
Freiburg
Pforzheim
Ulm
Munich
Saarbrucken
Luxembourg
Leverkusen
Wuppertal
Hildesheim
Oldenburg
Osnabruck
Bremerhaven
Hamburg
Kiel
Odense
Copenhagen
Malm
Rostock
Wolfsburg
Braunschweig
Berlin
Cottbus
Leipzig
Dresden
Gera
Szczecin
Slupsk
Gdansk
Grudziadz
Legnica
Wroclaw
Katowice
Krakow
Uppsala
Stockholm
Turku
Netherlands
Poland
Russia
Slovakia
Austria
Hungary
Switzerland
France
Slovenia
Croatia
Italy
Serbia and Montenegro
San Marino
Vienna
Zadar
Sarajevo
Belgrade
Timisoara
Tuzla

Project Objective

To look beyond current SOA metal-based spintronics to the exciting possibilities offered by FS nanospintronics devices which can realize the full potential of spintronics as they offer integration of magnetic and semiconducting properties allowing for a combination of information processing and storage functionalities. Research in this field is also leading to discoveries of new effects and functionalities that have been overlooked by conventional spintronics but whose exploitation will have major impact in the information technology industry…

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Working Structure

-Writing of information into, and manipulation of information with, the magnetic state of devices.

-Electrical information retrieval and manipulation.

-High frequency operation

-Theory, modelling and device integration/implementation schemes.

-Review and assessment of commercialisation potential

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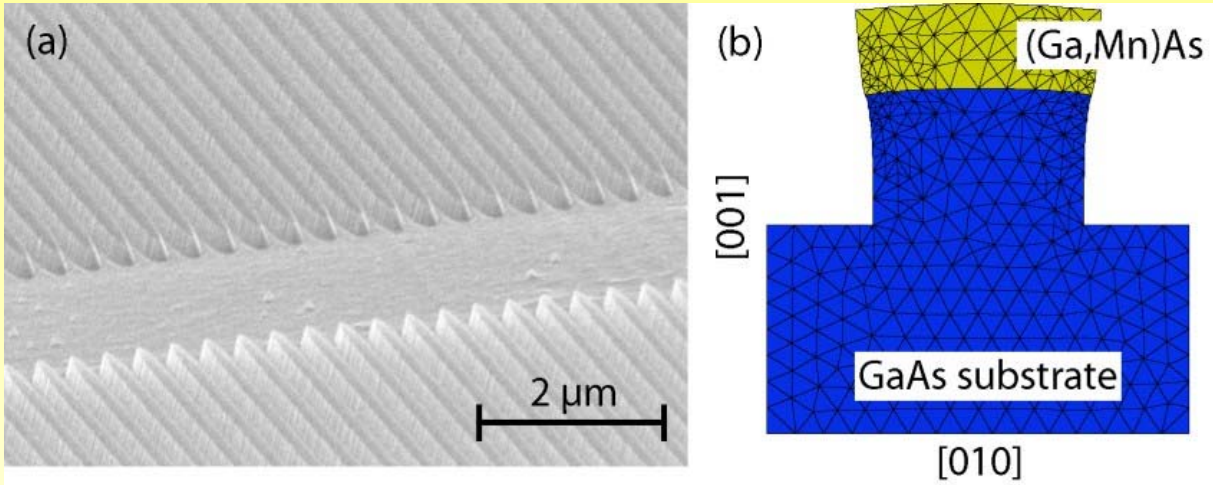
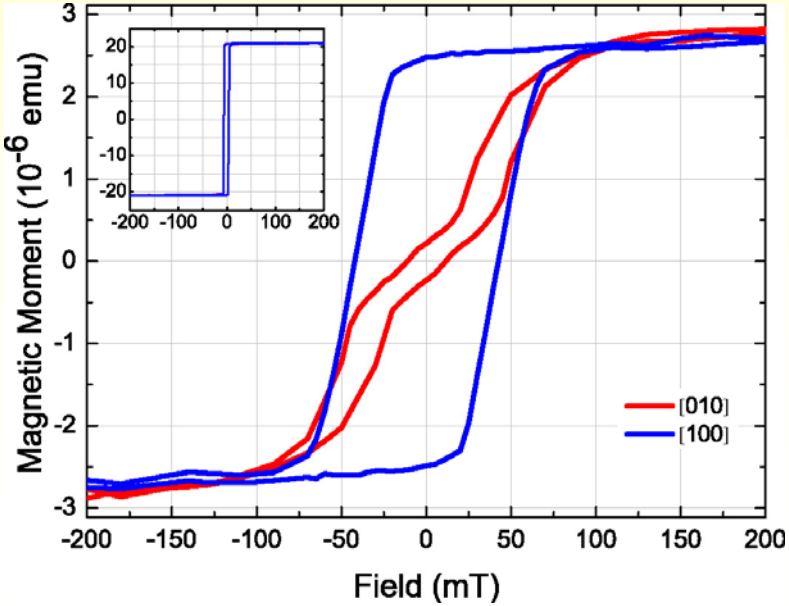
Writing 1: Shape anisotropy



SQUID



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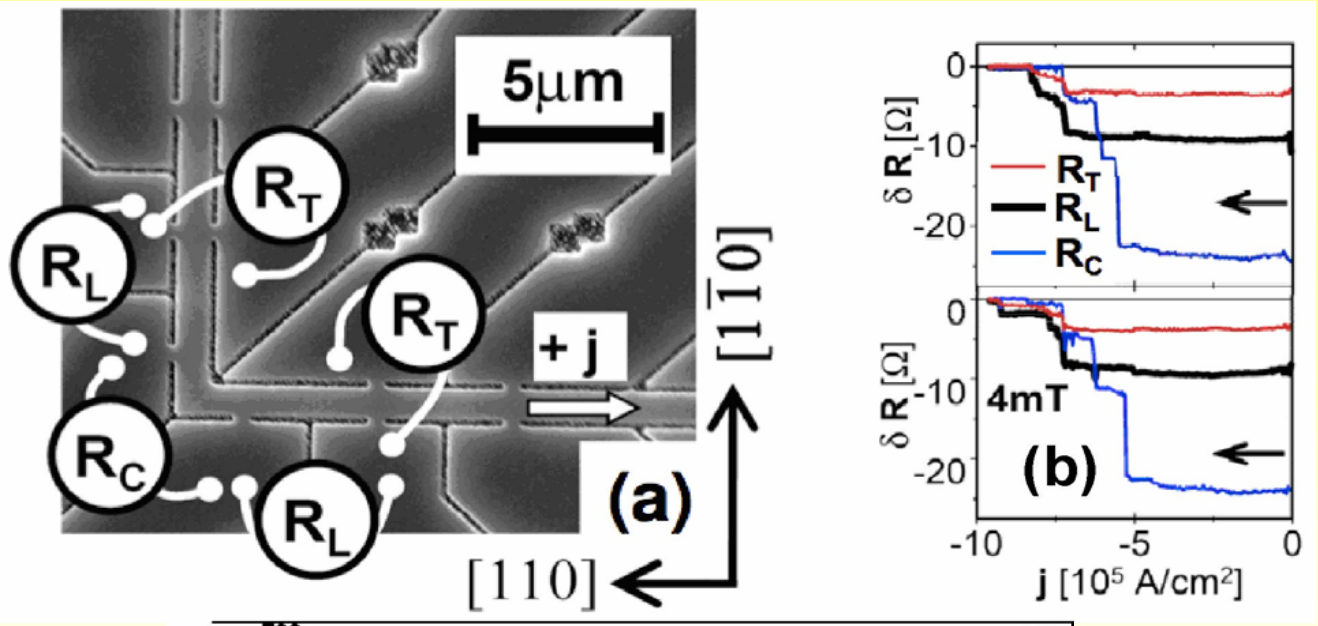
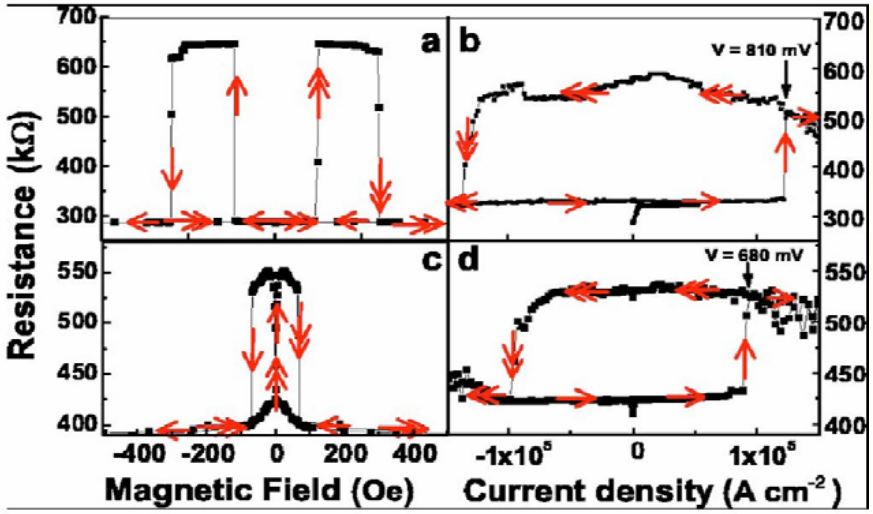
Writing 2: CI-MS & CI-DW Motion

Swithing currents of order 10^5 in lateral and vertical geometry.





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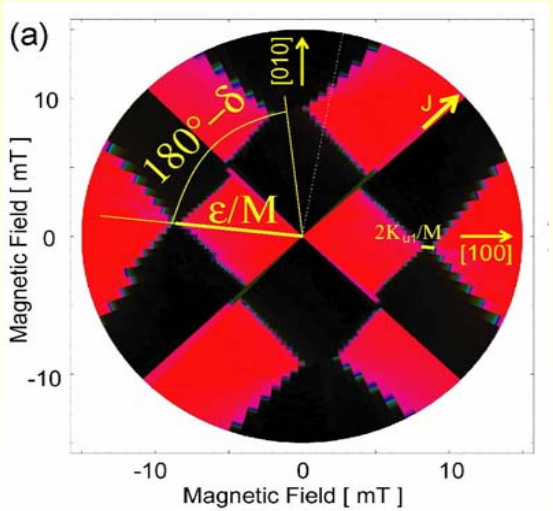
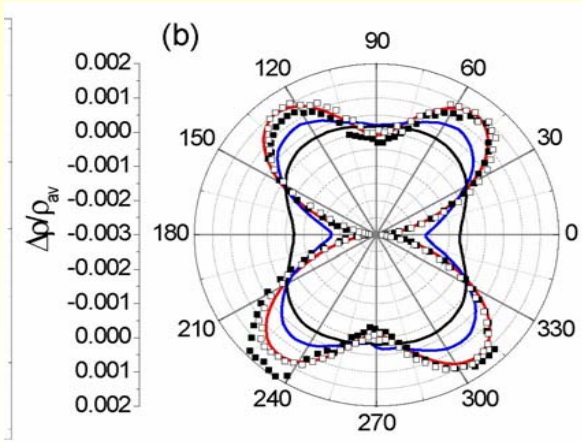
Reading: Fingerprints & Corbino's

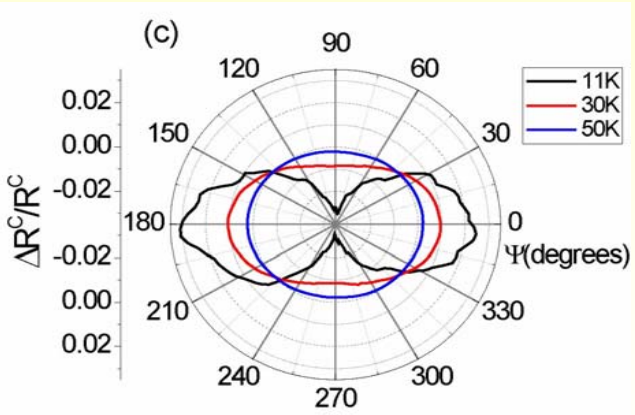
Resistance is a well defined (and now well understood) function of:

-Angles between current, crystal, and magnetization.

And can thus serve as direct read-out mechanism.







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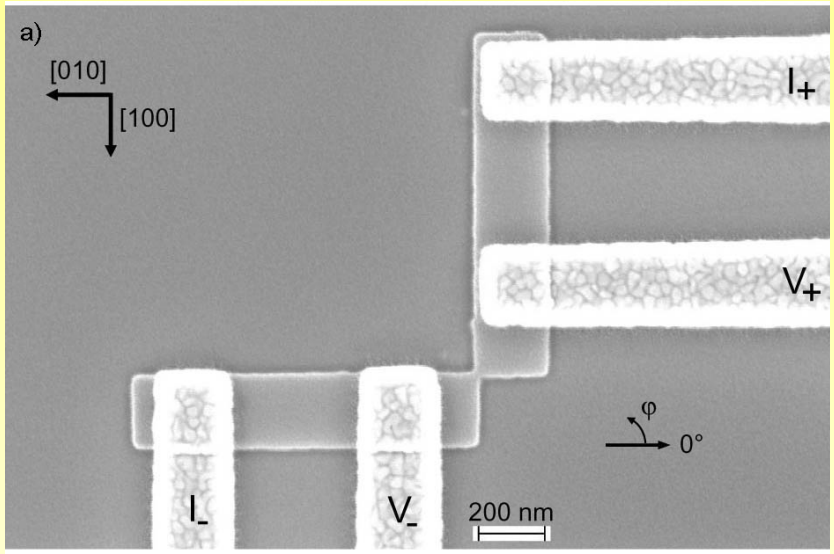
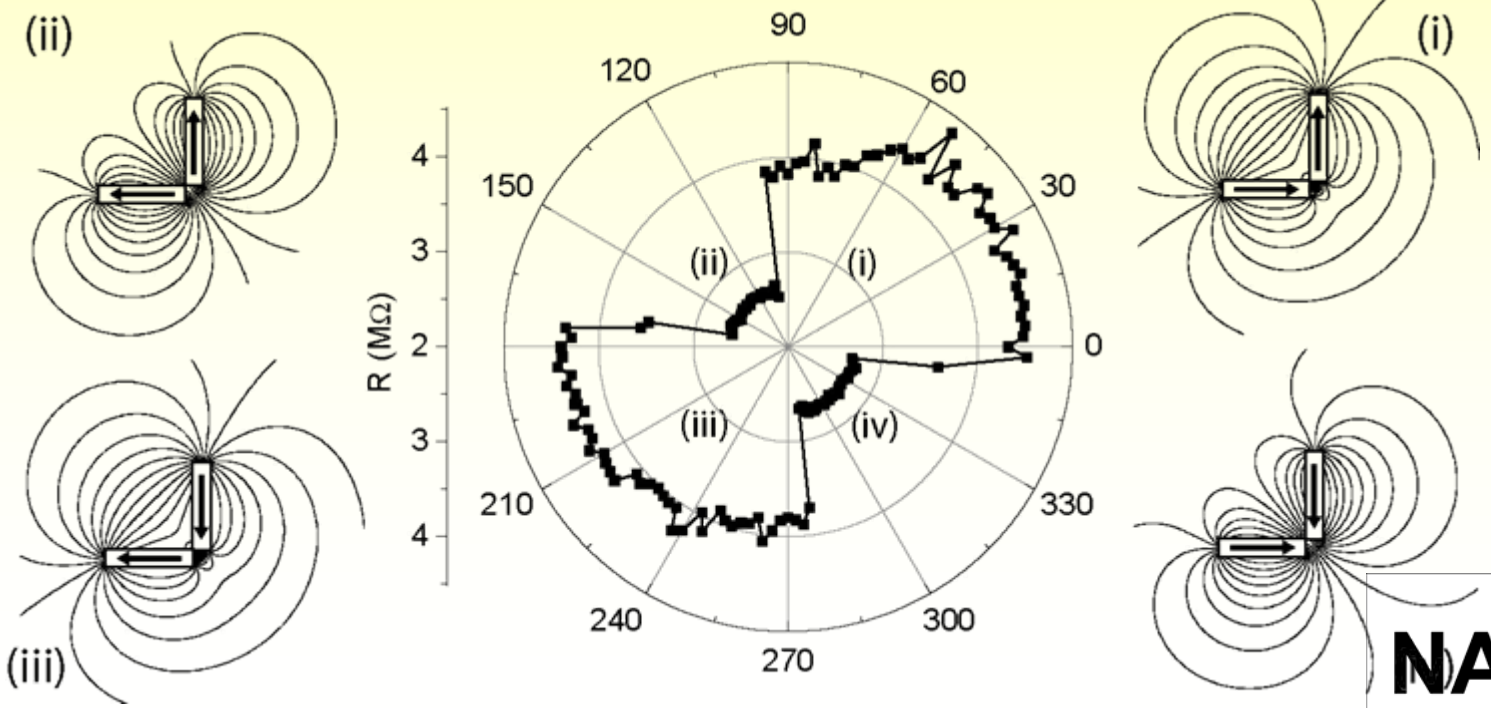
Non-volatile memory element





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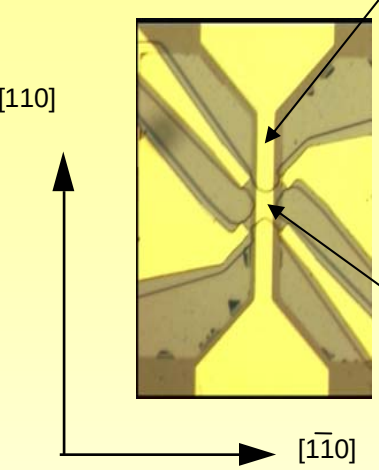
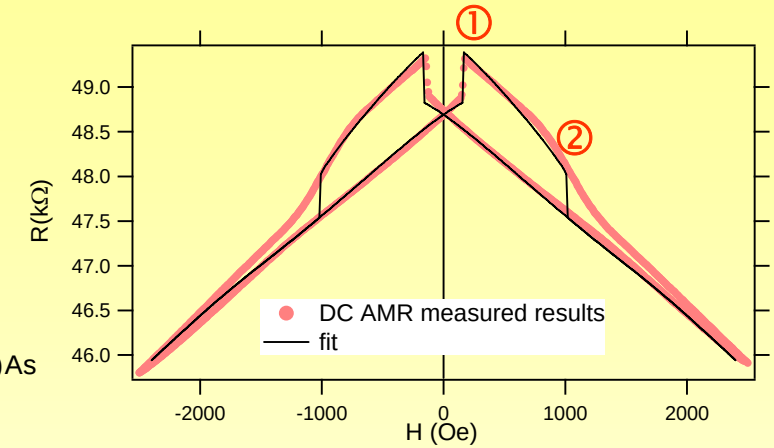
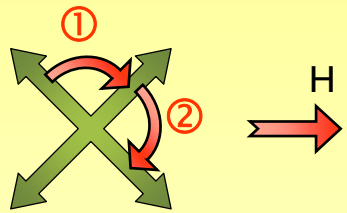
High speed operation

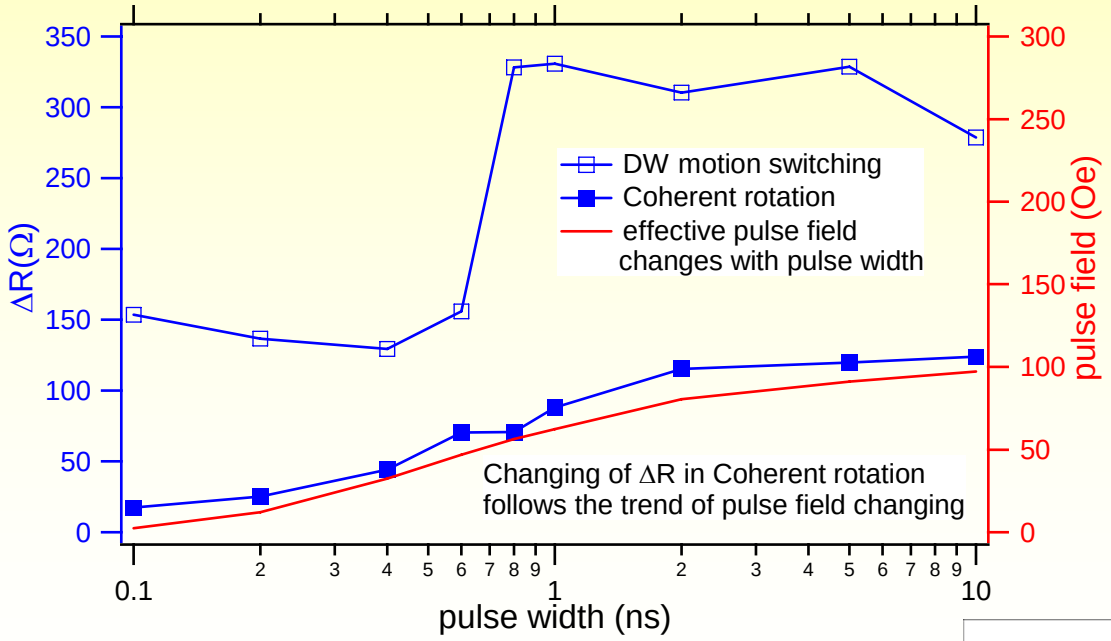






① Domain wall motion (DW)

② Stoner-Wohlfarth rotation (SW)



Materials issue and prospects

-Focus on device concepts, to complement world wide materials efforts
-Portability to other materials (including metals in some cases). Many effects previously overlooked have indeed now been seen in metal structures.

-Consortium members hold IP rights on over a dozen device concepts, many have already been partially commercialized.

-Medium term commercial interest:
- -Novel functionalities.
- -Integratability (avoid interconnect between storage and manipulation)
- -Power conservation (Vampire consumption becoming critical).
- -Niche markets (weight, certain extreme environments, etc).

-Long term interest:
- -Truly novel phenomena.
- -Full quantum information.

Various industrial players remain interested in both aspects.

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