



Next Generation Hybrid Interface for Spintronic Applications

THE PROJECT NEWSLETTER

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The Project HINTS

Next Generation Hybrid Interfaces for Spintronic Applications

The development of conceptually new materials following a “double beyond” trend, that is going “beyond CMOS” with “beyond silicon” materials, is one of the most challenging issues for the next generation of products for Information and Communication applications. Future devices for information processing able to increase the public wealth and occupation require a further material downscaling, together with a considerable reduction of power consumption and associated costs. While there exist still some room for moving in this direction inside the “silicon field”, it is widely accepted that the development of new materials and new paradigms is becoming increasingly imperative.

The Project faces these ICT challenges by combining naturally downscalable materials, organic semiconductors, with low energy consumption information processing via spintronic effects. More explicitly, **the main objective of the proposal is developing novel hybrid organic-inorganic materials featuring interfaces with conceptually new electric and magnetic behavior.**

Definition:

“Conceptually new materials”

includes a considerable modification of charge-spin transfer efficiency (quantitative case) and, on the other hand, and abrupt modification of the selection rules at such interfaces (qualitative case).

The Project is funded by the 7th Framework Programme, under the programme Cooperation, theme: nanosciences, nanotechnologies, materials & new production technologies (NMP).

The Project started the 1st June 2011, involving both academics and industrial partners focused on potential application, ensuring an effective exploitation of results.

The HINTS project involves 14 entities from 8 Countries, of them with specific roles different levels of involvement.

The consortium is composed Universities, 3 Research Centers and four companies spread across Europe.



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NEWS

The Kick-off launched the Project



In June 2011, the kick-off meeting took place in Bologna, at the ISMN-CNR location, the 23rd –24th June 2011. Most of the partners were present at the meeting, including the Project Officer from the European Commission.

The meeting has been coordinated by the Project coordinator, Alek Dediu from ISMN, with the aim of meeting and presenting the partners to the all consortium and to put down the basis for a good start of the Project.

Every partner has introduced itself through a presentation describing the organization it belong to, and the work they will be perform within the Project.

Central points regarding the beginning of the activities were intensely discussed, in order to put the Project on a profound basis.



Second Meeting: Project progress

THALES



At the beginning of December, the 7 Month meeting has been held in Paris, at THALES premises, and it has been concluded with a visit in the joint laboratory between Thales and CNRS.

The meeting lasted two days. The first day was centered on a deep discussion about the activities to be carried on for the characterisation and selection of the core set of inorganic SI components and organic SC components for use in HOI materials, and the characterisation of the starting set of HOI interfaces for use in HOI materials.

The second day the partners presented the work perform for the Project





during the first six months, and the future plans for the next activities to be carried out. The partners shared their expertise in the field of investigation of the project HINTS, which will be made available for the Project, and provided their contribution.

The European Commission was also present in the participation of the PTA (Project Technical Advisor).



The launch of the website

The Project website has been launched the 26th December 2011, and it is now active on the web and available at the URL www.hintsproject.eu.

As major mean of dissemination, the overall objective of the HINTS website is to disseminate and exploit the results of the project and make the benefits and achievements known to relevant target groups. At this first stage the website has a public area, divided into different sections providing the audience with information about the project and about the consortium, and an intranet with a repository and a chat system. The website is now expected to evolve and develop throughout the duration of the project and, after its launch, it will continue to develop and expand.



The workshops

A **special Workshop** dedicated to a deep discussion of specific scientific problems raised in the frame of the researches performed for the HINTS project, is going to be held **in Bled lake, Slovenia, next 11-12 October 2012**.

The event will be hosted by the Josef Stefan Institute (JSI), of Ljubljana (Slovenia).

The workshop “Bridging the growing gap between skills and challenges” will be held in Brussels, next November 2012. The focus will be on the road mapping initiatives. It is an established trend of the last 20 years to develop international road mapping initiatives to guide the R&D trends in identified strategic fields. Despite of the increased capacity to channel and foster effectively R&D funding and direction, the flourishing of these initiatives has provided a certain degree of scattering in the fields of relevance. As a consequence several attempts are being made to unify the different approaches at international, European and national level. We believe one of the missing concepts is the understanding of the qualitative nature of human reasoning and thinking. The aim of the workshop is to provide a fertile background for channelling experts skills towards the identification of unitary approach to complex issues such as road mapping.

The workshop will develop through practical sessions, by means of an innovative tool and approach to end in the coral development of a position paper.

The results will be given the highest visibility towards policy makers, funding agencies, academy and Industry.

Project Status

We are now running the 13 month of the Project lifetime. Up to now, 10 deliverables have been produced, one milestone has been achieved, and another one is going to be reached. Specifically, in the first months of the Project, a full set of protocols for the three tailoring approaches have been established, and now the focus is on the evidence for the spin enhancement by any of the tailoring approaches. The project has now achieved the first year of life and this was characterized by a set of encouraging results among which we can mention 1) the achievement of strong GMR modulation via both proximity effect and electrical gating at spin injecting and collecting hybrid interfaces, 2) promising preliminary results of SAM assisted TMR junctions, 3) extraordinary first observation of the GMR inversion in a GMR device via electrical field gating and 4) first modification/adjustment of the technological tools (effusion cells) as required by the needs driven by HINTS objectives.



Spotlight

The Universitat de València-Institute for Molecular Science is organizing the 40th International Conference on Coordination Chemistry that will be held in Valencia (Spain) in September 2012 (from the 9th to the 13th).

For more information please visit the web site www.iccc40.com.

We are looking forward to welcoming you in Valencia!



The V European School on Molecular Nanoscience (ESMOLNA 2012) will be held in Cuenca (Spain) 21-26 October 2012. Lectures are aimed at the post-graduate level as they will be presented to an audience primarily formed by post-graduate, PhD students and postdoctoral fellows. For more information please visit the ESMOLNA2012 web site www.icmol.es/esmolna2012



The University of Valencia is happy to remind that the symposium on “Frontiers in Metal-Oxide Cluster Science-II” (FMOCS-II) will take place on November 18-22, 2012 at the Hotel Costa Calero (<http://www.hotelcostacalero.com/>) located in Lanzarote (Canary Islands, Spain).

We expect participation of about 60 people with 40 talks and 20 communications approximately in which all aspects of polyoxometalate molecular science will be covered: Homogeneous and Heterogeneous catalysis, Reaction mechanisms, Structure and Bonding, Dynamic structures in solution, Magnetism, Self-assembly, Supramolecular chemistry, Inorganic/organic hybrid materials, Molecular Nanoscience and Interfacial phenomena.

The Queen Mary and Westfield College University of London, was present at the Intermag 2012 (May 2012, Vancouver), giving an invited talk to the “Spin transport in hybrid organic-inorganic structures” session. He will also go on a seminar



tour of various Chinese universities, which is primarily concerned with setting up more general links with QMUL and those universities. However, he will present some of the research undertaken by HINTS. <http://www.2012.intermagconference.com/>



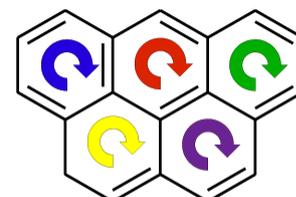
INTERMAG 2012 May 7th to 11th
VANCOUVER IEEE International Magnetism Conference

The first year results of the HINTS Project will be presented at SpinOS 2012, the 4th International Meeting on Spins in Organic Semiconductors, which will be held in London, 10th – 13th September 2012.

The conference aims to bring together scientists investigating the behavior of spins in organic semiconductors. To build on recent advances in organic spintronics, magnetic field effects in organic systems, organic magnets, spin chemistry. Material systems of interest include π -conjugated polymers and small molecules, fullerenes, and graphene.

The event will provide great opportunity for physicists, device engineers and materials and physical chemists to meet and discuss ideas, solutions and future issues relating to the scientific study and technical implementation of organic semiconductor devices whose functionality is based on spins. The program is scheduled to provide room for open discussion and interaction.

<http://spinos.ph.qmul.ac.uk/?p=25>

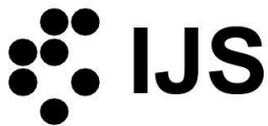


SPINOS 2012

In the Local Organising Committee we have QMUL, UNIKL. In the Programme Committee we have QMUL, UNIKL and ISMN.



Project partners



Linköping University

**THALES**