PROJECT FINAL REPORT

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[1] Usually the contact person of the coordinator as specified in Art. 8.1. of the Grant Agreement .
[2] The home page of the website should contain the generic European flag and the FP7 logo which are available in electronic format at the Europa website (logo of the European flag: http://europa.eu/abc/symbols/emblem/index_en.htm logo of the 7th FP: http://ec.europa.eu/research/fp7/index_en.cfm?pg=logos). The area of activity of the Project should also be mentioned.

Table of summary

Index of figures

Index of tables

1. Final publishable summary report

1.1 Executive summary

The Consortium has succeeded to fulfil all the most important and ambitious objectives of the project. The extremely challenging objective of controlling the sign of the spin transfer at the interface (objective still critical in inorganic spintronics) has been achieved even in two different ways: by chemical tailoring of the interface (foreseen in the workplan) and by electric interfacial tuning (discovered by HINTS). While the former allows to select the sign during sample fabrication, the latter, attributable to a smart multifunctional interface behaviour, allows to change the sign during the device operation (reconfigurable operation). HINTS succeeded to bring to 11V the voltage interval where the magnetoresistance is detected, while the workplan objective was 3-5V. While highest voltage operation was detected at low T (<50 K), some materials maintained these properties up to 200-250K close to room temperature operation. This achievement paves the way for future detailed investigation of spin polarized effects on OLED behaviour, considering such parameters as efficiency, colour and other. Indeed, HINTS anticipated this by showing unequivocal and strong effect of spin polarization of driving currents on OLEDs (HyLEDs) electroluminescence.
Realization of continuous interfacial tailoring layers and realization of HOI interfaces with sharpness of 1 nm (approximately one molecule size) have been achieved. This achievement exceeds the state-of –the art quality of interfaces in OLED and OFET devices and could be applied beyond organic spintronic applications.
Interfacial proximity effect was found to embody the most powerful tailoring method for the control of spin transfer across HOI interfaces. The energy of this effect exceed room temperature promoting routes for conceptually new device paradigms. Innovative devices based on rich linear and nonlinear interface effects will definitely represent most proficient application and research line on the short and short-medium terms.
The modification of interfacial spin transfer by insertion of magnetic molecules (high spin) was also achieved. While this fulfils the objectives of the project, the modification was generally negative. Revealing the full potential of merging together the fields of spintronics and molecular magnetism would represent the topic for a fully dedicated project or even number of projects and will for sure constitute one of the most advantageous future research lines. A disruptive progress was achieved by a joint experimental-theoretical effort concerning the basic rules governing the spin transfer at HOI interfaces. HINTS looked "inside the interface" revealing how the spin dependent residence time is distributed in the first 2-3 monolayers of the organic semiconductor. The spin dependent residence time at the interface was proposed as a key parameter for the spin filtering capability. The model, based on spin dependent band broadening and energy shifts, was strongly upgraded by HINTS. Both approaches indicate robust room temperature spin transfer and spin selectivity outcomes.
On the theoretical side it has been revealed for the first time the enormous role in spin injection and transport of the resistance non-linearity in organic semiconductors. The built model defines the set of parameters, such as interface resistance, organic resistance, voltage and others, able to provide the detection of the magnetoresistance (similarly to conductivity mismatch effect in inorganic spintronic devices).
The involvement of industrial partners in the main project objectives has further grown up. Thus, two equipment producing partners succeeded to develop useful modifications to their commercial products as stimulated by the needs of HINTS requirements to the interface.
HINTS was funded with 3,874,360.00 € granted by the European Commission in the 7th Framework Programme, coordinated by Dr. Valentin Dediu of the Institute for the Study of Nanostructured Materials - ISMN (Italy), and carried out by a consortium of 14 leading research institutions coming from 8 Countries, each of them with specific roles and different levels of involvement.

1.2 A summary description of project context and objectives

HINTS main goal was to advance new solutions for spintronic devices via the control and the tunability of the interface spin-transfer efficiency. It was the first time a research program addressed so methodically this subject, aiming essentially at putting the basis of a new generation of spintronic devices able to go beyond current GMR and TMR (commercial) achievements. Hybrid organic-inorganic (HOI) materials and interfaces were the materials of choice, featuring such advantage as the low-cost processing and the greatest choice of molecules.
All the main objectives of the project have been successfully fulfilled.

HINTS OBJECTIVES and HINTS SOLUTIONS

Develop innovative HOI materials with interfaces exhibiting binding interactions specifically tailored for targeted spin transfer properties => Various combinations of materials have been fabricated and investigated along three tailoring approaches: proximity effect, dipole tailoring, magnetic molecule tailoring.

Establish the basic rules governing the spin transfer behaviour at HOI Interfaces with different chemical bonds => Disruptive success achieved in joint experimental-theoretical work: proposed both a DFT based description and a phenomenological model able to describe both interfacial spin injection and spin transport inside the organic medium.

As a consequence of the newly developed knowledge: fabricate a set of HOI materials with interfaces that allow for enhanced control of spin-selectivity => Chemical and electric interfacial tailoring have lead to a selectivity control exceeding 100% (sign reversal achieved).

Design a set of HOI materials with tunable interfaces featuring a high (above 90%) spin transfer efficiency => Some interfaces showed spin transfer close to 100%.

Develop HOI Interfaces with efficient spin injection at high bias voltages compatible with new ICT applications for hybrid Spintronics materials (3-5 V electrical bias) => Achieved spin injection at 11 V, outstanding achievement opening the door for applying spintronic effects in OLEDs and OFETs.

Develop new processing technologies and protocols able to maintain the Spintronics parameters of HOI interfaces on large area (3-inches standard) wafers in UHV conditions => demonstrated evaporation of HOI materials on 3" substrates with thickness homogeneity exceeding 95 % and a material utilisation efficiency of 15%.

Develop new processing technologies and protocols allowing for decreased material consumption for both UHV and solution processing methods => High TRL value achieve introducing (low) consumption modifications to prototypes of commercial effusion cells (UHV). Breakthrough research performed for the utilization of solution processing in organic spintronics.

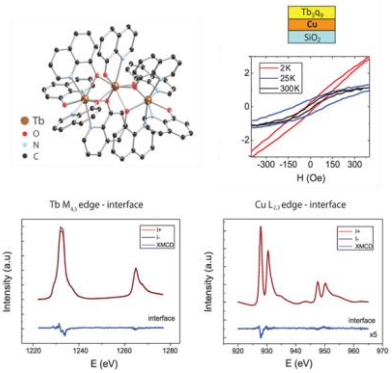
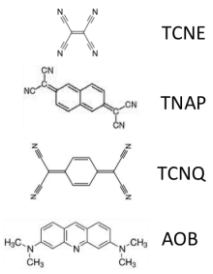
Select HOI materials with interfaces able to maintain high spin-charge transfer efficiency under conditions compatible with flexible electronics requirements => while representing a secondary objective by dedicated effort, excellent compatibility between selected HOI materials and flexible substrates demonstrated.

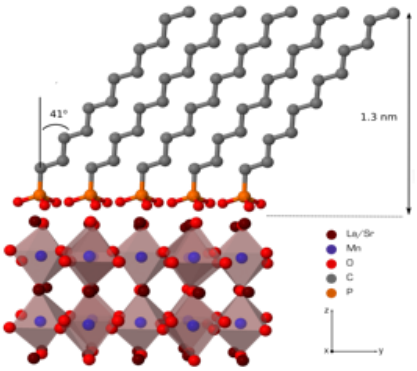
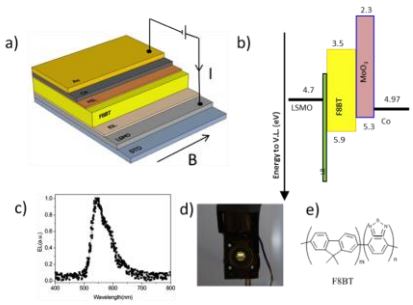
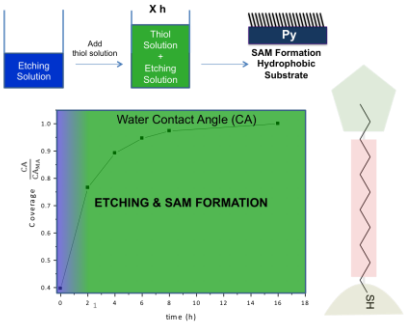
Assessment of the innovative HOI materials with regard to selected ICT applications => HINTS dedicated significant efforts to these aspects under the guidance of industrial partners.

Assessment of the innovative HOI materials towards roadmapping trends and development of a set of proposals for the update of ICT roadmaps => A set of roadmapping recommendations developed.

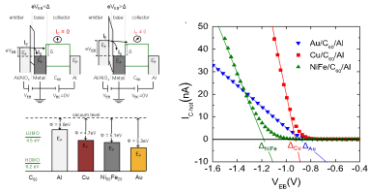
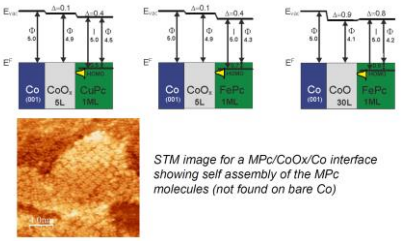
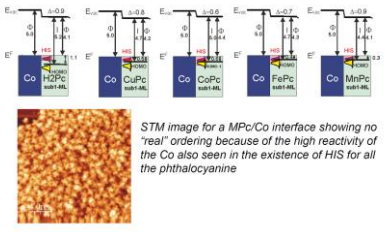
1.3 A description of the main S&T results/foregrounds

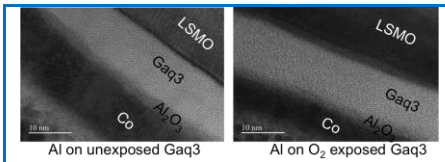
The main achievements of the project are presented for clarity in the table below.

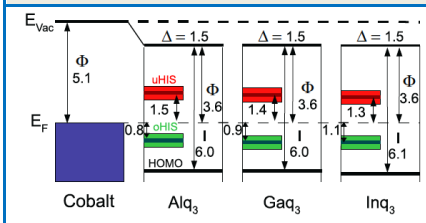
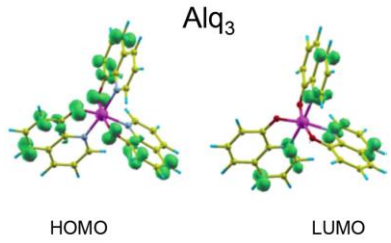
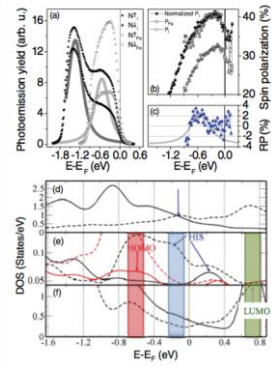
WP1		
Selected results	**Brief description**	**Partners involved**
	Molecular driven magnetism on reactive metal surfaces. The outcome of this study provides an alternative way to create spin-polarized interfaces, relying on the interaction between high-spin quinoline molecules (Tb_3q_9) and *non-magnetic* metallic surfaces. The molecules preserve their structural, chemical and magnetic properties when deposited onto noble metal (Au) and passivated (SiO_2) surfaces; while the adsorption on reactive metals such as Cu induces a magnetic phase at the interface involving molecular Tb-atoms, as measured via SQUID magnetometry and element-specific X-ray magnetic circular dichroism (XMCD). Remarkably, the magnetic ordering at the hybrid interface persists up to room-temperature for the Tb_3q_9/Cu system and is linked to a chemically-triggered change in structure and stoichiometry of the interfacial species. On the one hand, our work provides a route towards a controllable "magnetic doping" of a metal surface through molecular adsorption, while on the other hand, the creation of a magnetically active interface between a *non-magnetic* metal and a high-spin molecular layer opens new avenues for the design of a new class of molecular-based spintronic devices. *Paper submitted 2014.*	NANOG (leader), UVEG, TCD, UNIKL, LiU **Scientific Impact**: Fully innovative knowledge concerning proximity effects. **Application Impact**: Possibly innovative technological approach for tailoring interafces.
	Dipole-layer: tuning work function and spin polarization. We use strong donor and acceptor molecules with p-orbitals to tune energy level alignment and magnetic properties of the FM-based (Fe, Co, Ni) HIS Utilizing the acceptor molecules (TCNE, TNAP and TCNQ) we can achieve high work function HIS with effective WF in the tunable range of 5.0 to 5.7 eV, suitable for hole injection The donor molecule, AOB, allows us to create low work function HIS with an effective WF ~3.4 eV Organic Electronics, 15 (2104) 1951; Advanced Functional Materials, 24 (2014) 4812; Manuscript in preparation.	LiU, UNIKL, CNRS, NANOG **Scientific Impact**: Fully innovative knowledge concerning proximity effects. **Application Impact**: Possibly innovative technological approach for tailoring interfaces.
	Growth of Self-assembled monolayer of dipolar molecules on LSMO surfaces. (La,Sr)MnO3 manganite (LSMO) has emerged is widely used in organic spintronic devices due to its highly spin-polarized character and air stability. Whereas organic semiconductors and polymers have been mainly envisaged to propagate spin information, self-assembled monolayers (SAMs) have been overlooked and should be considered as promising materials for molecular engineering of HOI interfaces. Surprisingly, up to now	CNRS, Thales, UVEG **Scientific Impact**: First ever grafting of SAM on LSMO surface. Efficient spin injection achieved.

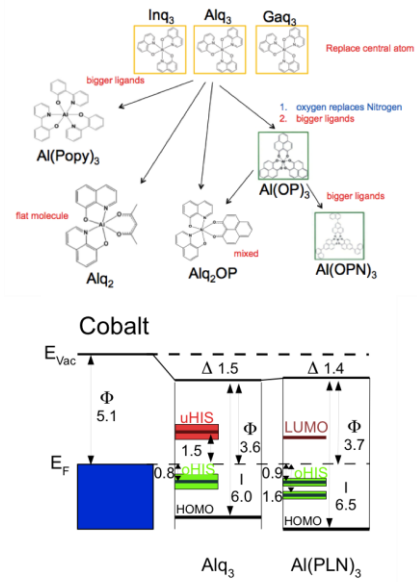
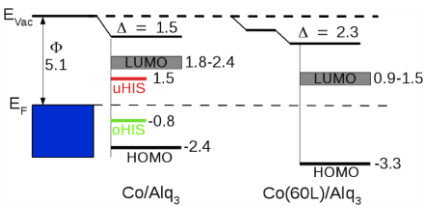
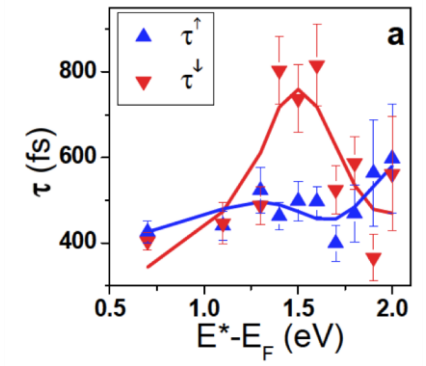
WP1		
Selected results	**Brief description**	**Partners involved**
	the first key step of SAM grafting protocols over LSMO surface thin films is still missing. Demonstrated that alkylphosphonic acid groups can be used as the preferred anchoring group when dealing with the self-assembled monolayer functionalization of the standard ferromagnetic electrode material LSMO. Hence alkylphosphonic acid based SAMs are suitable to design HOI interfaces with an indirect contact between spin injector (SI) and spin collector (SC). ***ACS Nano*** *6, 8753 (2012)*	**Application Impact**: Compatibility of most advanced spintronic interfaces with cheap solution processes demonstrated.
	A new concept of fabricating organic spin valve (OSV), concretely fabrication of organic semiconductor from solution methods instead of expensive and complicated evaporation techniques besides we introduced the use of ionic molecular monolayer in the fabrication of a light-emitted OSV. It was established for the first time an OSV and a spin-polarized electroluminescent device with ferromagnetic electrodes that acts as a bipolar OSV, based in solution and low cost methods. Our OSV shows a spin valve magneto electroluminescence (MEL) effect of around 1%.	UVEG, CNR **Scientific Impact**: High efficient light emission at conditions compatible with spin polarized injection **Application Impact**: Enables the possibility to control light emission in OLEDs by magnetic field (efficiency, read –write options etc)
	Growth of Self-Assembled Monolayer of dipolar molecules on Permalloy and Cobalt surfaces The fact the LSMO's surface Curie temperature (Tc) is close to room temperature, implies that spintronic effects in LSMO-based devices are expected only at low temperature. Hence, after the interesting results obtained using self-assembled monolayers (SAMs) on LSMO as interfaces between spin injector and spin collector in basic spintronic devices, it will be desirable to substitute LSMO by a ferromagnet of higher Tc, as for example ferromagnetic (FM) metals or alloys, like cobalt (Co) or permalloy (Py). Unlike LSMO, FM metals readily oxidize and it is not surprising that SAM grafting protocols over FM electrodes are almost non-existing. We have developed the grafting protocols necessary for the integration of SAMs on 3d FM metals with solution approaches. The formation of SAMs on Co and Py both under ambient conditions and in inert atmosphere, after removing the oxide with a simple wet etching process, have been achieved. We have observed that comparing with oxidized Py or Co, the ferromagnetic behaviour of the substrate can be improved during the solution processes. By standard characterizations it is probed that only thiol group can be successfully grafted on ferromagnetic surfaces whereas phoshonic acids group	UVEG, CNRS, Thales **Scientific Impact**: Grafting protocols of SAM on clean and oxidized ferromagnetic metallic surfaces in glove box conditions. **Application Impact**: Compatibility of most advanced spintronic interfaces with cheap solution processes demonstrated.

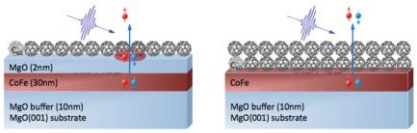
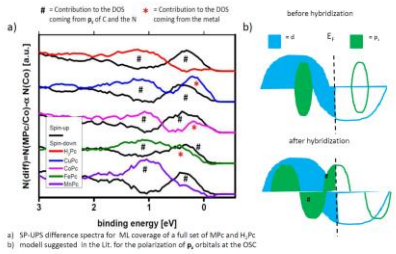
WP1		
Selected results	**Brief description**	**Partners involved**
	works with oxidized metal surfaces.	

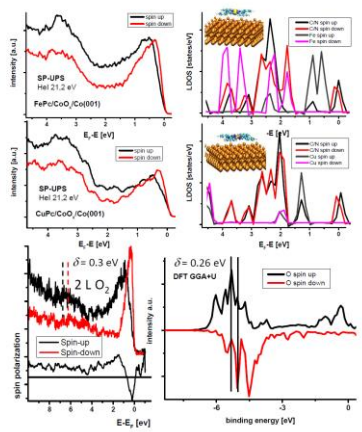
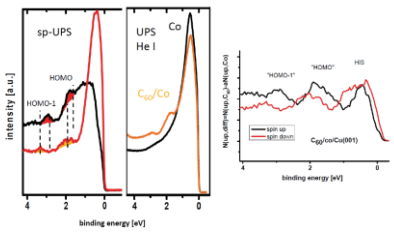
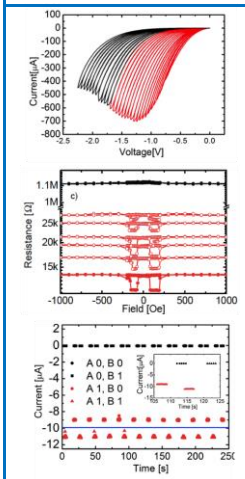
WP2		
Selected results	**Brief description**	**Partners involved**
	Determination of the metal-molecule energy-level aligment by in-device spectroscopy In this study, we have shown that the energy alignment at metal/molecule interfaces can be measured in a chip by the fabrication of a simple 3-terminal device. As a proof of principle, we measured the energy barriers at the interfaces between C_{60} and different metals. Furthermore, such a device can be used to inject carriers in the organic layer overcoming the contact resistance. This property allows the injection of a highly spin-polarized current into a molecular layer and to study its conduction properties at very low temperatures, in a range where the contact resistance usually prevents any carrier injection. We anticipate that this scheme for charge injection free from the contact resistance is not limited to bulk semiconductors, but can be extended in principle to any semiconductor, including solution-processable semiconductors and monolayer dichalcogenides. ***Nature Communications*** *4, 2794 (2014)*	NANOG **Scientific Impact**: New HOI interface characterized **Application Impact**: Innovative and cheap approach for interface energetics in HOI based devices
 *STM image for a MPc/CoOx/Co interface showing self assembly of the MPc molecules (not found on bare Co)*	A 1/2 ML of oxygen on the Co(001) surface acts as a „wetting" layer. STM measurements show that MPc's generally form self-assembled layers on such a ultrathin oxygen layer. We found that oxidation of the cobalt going from ½ ML to higher thickness leads to a gradual suppression of hybrid interface states, and moreover to a progressive change in the work function as also seen for the Co-Mq3 interface.	UNIKL **Scientific Impact**: Oxygen layer effect on interface hybridization. **Application Impact**: Possible tailoring approach.
 *STM image for a MPc/Co interface showing no "real" ordering because of the high reactivity of the Co also seen in the existence of HIS for all the phthalocyanine*	STM measurements show that for MPc's on Co there is no "real" ordering as seen for the self-assembled layers on the MPc/CoOx/Co system. No decoration on the edge of the surface terraces indicates the high reactivity found for all the MPcs on the native Co surface. The surface dipole saturates for all the MPc systems including H2Pc when reaching 1 monolayer (ML) indicating the interaction with the substrate is related to the first monolayer. UPS measurements (He I and He II) clearly show that the H_2Pc-MnPc molecules bind strongly to the Co surface and are forming HIS near/at the Fermi level. ***Advanced Functional Materials****, 22, 989 (2012)*	UNIKL **Scientific Impact**: Confirming the role of the oxygen layer **Application Impact**: Possible tailoring approach.

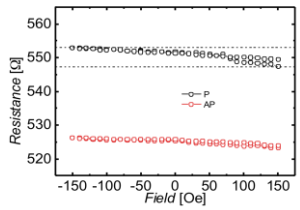
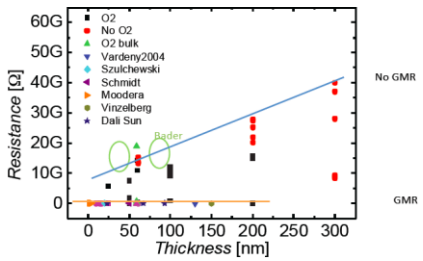
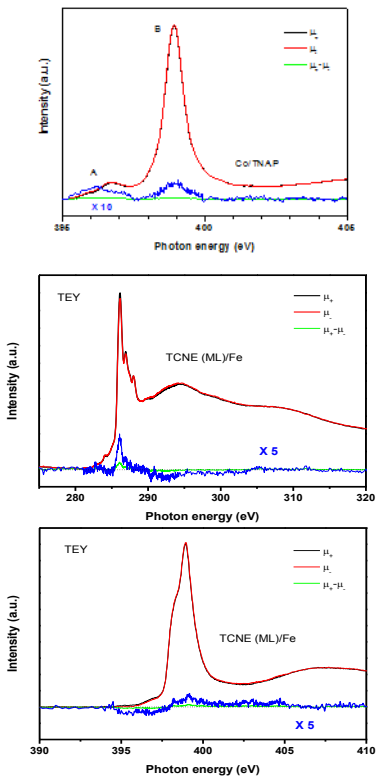
 Al on unexposed Gaq3 Al on O_2 exposed Gaq3	Key improvements of the Interface Co/AlOx/Alq3 It was demonstrated by Hard X ray photoemission spectroscopy and TEM analysis that exposure of Alq3 to O2 before the deposition of metal provides a much better top electrode/organic interface characterized by higher morphological and chemical sharpness (1-2 nm interface width). Paper in preparation 2014.	CNR **Scientific Impact**: Burried interface investigated **Application Impact**: New routes for direct deposition of reactive metals on Alq3

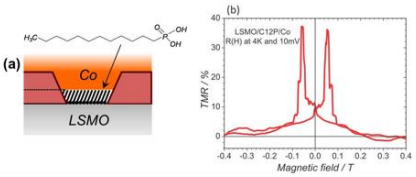
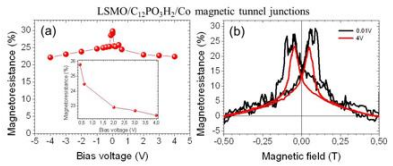
WP3		
Selected results	**Brief description**	**Partners involved**
 	Static characterization of the Co-Mq3 interface We have used spin-resolved photoemission spectroscopy to study the static spin-dependent electronic properties of the interface formed between cobalt as ferromagnetic electrode and three metal quinolines: Alq3, Gaq3 and Inq3. By combining ultra-violet-photoemission spectroscopy (UPS), spin-resolved near-threshold photoemission spectroscopy (NT-PS), spin-resolved two-photon photoemission (2PPE) spectroscopy and state-of-art density functional theory (DFT) calculations (performed in WP1), our study unequivocally shows that all three Mq3 molecules bind so strongly to the surface that spin-polarised interface states are formed. Interestingly, the interface electronic structure is very similar in all cases. This is a consequence of the fact that for all the three molecules, the HOMOs are localised on the phenoxide moiety of the ligands, while the three LUMOs on the pyridyl moiety: thus almost no charge is localised on the metal centres. ***PRB*** *89, 094412 (2014)*	UNIKL, TCD **Scientific Impact**: Accurate detection of proximity induced purely interface spin polarized states. **Application Impact**: Enable conceptually new device paradigms based on non-linear interface behaviour.
	Formation of hybrid interfaces We have studied the formation of hybrid interfaces by two complementary spectroscopic methods: spin-polarized STS (scanning tunneling spectroscopy) and spin-polarized NT-PS (near threshold- photoemission spectroscopy). Both methods give evidence for the formation of spin polarized hybrid interface states in the energetic region close to the Fermi level. ***PRB*** *84, 224403 (2011)*	UNIKL **Scientific Impact**: Definition of the energetics of the proximity induced interface states. **Application Impact**: Enable conceptually new device paradigms based on non-linear interface behaviour.

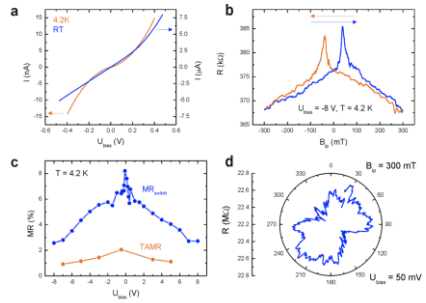
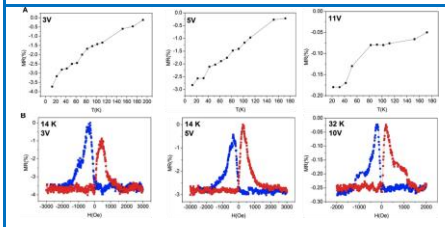
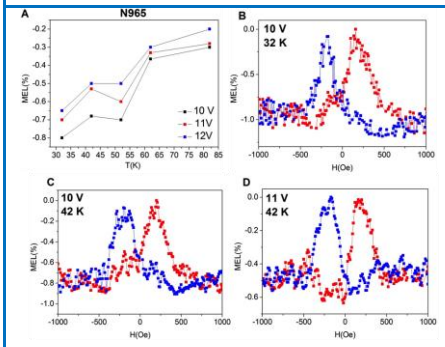
WP3		
Selected results	**Brief description**	**Partners involved**
	Chemical tailoring of the spin properties of the Co-Mq3 interface We have created different experimental molecules to tailor the spin-dependent properties of the interface by modifying chemisorption with cobalt. For example, Al(OP)3 was developed to produce a ligand that has more extended p-systems than Alq3. We expect a modification of the chemisorption on cobalt, and thus different spin-dependent properties of the Co/Al(OP)3 interface with respect to Co/Alq3. Using spin-resolved photoemission methods, we have indeed identified two hybrid interface-states in the energy window of 2 eV below the Fermi energy, in contrast to the Co/Alq3 interface where only one hybrid state is present. ***NJP** 15, 113054 (2013)*	UNIKL, TCD **Scientific Impact**: New (HINTS developed) molecules show modified interface hybridization. **Application Impact**: Enable conceptually new device paradigms based on non-linear interface behaviour.
	Physical tailoring of the spin properties of the Co-Alq3 interface We have used oxidation of the Co/Alq3 interface to control its electronic properties. Oxidation of cobalt is expected to dramatically influence the strength of hybridization with the deposited molecules, and as a consequence the spin-dependent electronic properties of the interface. By UPS, NT-PS and 2PPE we found indeed that oxidation of the cobalt leads to a gradual suppression of hybrid interface states, and moreover to a progressive change in the work function and to a continuous energetic shift of the molecular orbitals towards higher binding energies. Based on our spectroscopic observations, we have suggested controlled oxidation of the ferromagnetic electrode as an easy and effective possibility to tune the spin-properties of metal/organic interfaces. ***APL** 103, 251603 (2013)*	UNIKL **Scientific Impact**: Defined the role of superficial oxygen on spin polarization. **Application Impact**: Enable soft interface modifications in future HOI devices
	Microscopic understanding of hybrid metal-organic interfaces We have used spin- and time-resolved two-photon photoemission to study the spin-dependent electron relaxation across hybrid interfaces. We found that electrons injected across hybrid interfaces are trapped into hybrid interface states in a spin-dependent manner for a surprisingly long time of the order of 0.5–1 ps. This is the microscopic origin of the spin-filtering properties of hybrid interfaces. The achieved microscopic understanding of the spin-dependent dynamics at hybrid interfaces lays the foundation for designing advanced actively controlled spintronics devices. ***Nature Phys.** 9, 242–247 (2013)* ***Nature Phys.** 9, 210–211 (2013)*	UNIKL, CNR **Scientific Impact**: Outstanding achievement – first look "inside" the interface. **Application Impact**: Promotes new ways to describe key device parameters. Room temperature operation.

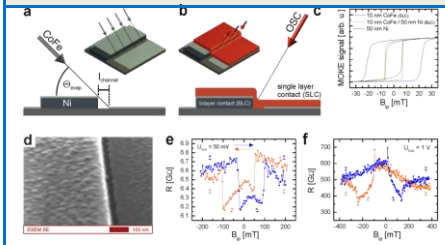
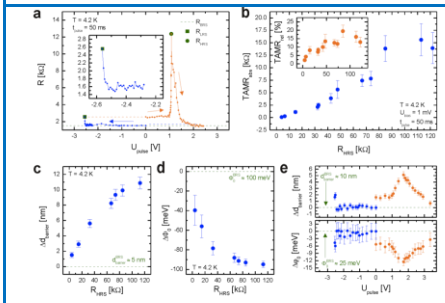
WP3		
Selected results	**Brief description**	**Partners involved**
FIGURE CONFIDENTIAL	Coherent excitation of hybrid interface states We have performed phase-stabilized two-photon photoemission experiments at the Co-Alq3 interface to probe the coherence of the optical excitation across hybrid interfaces. We have found long-lived excitations with coherence times of up to 110fs. This demonstration of coherent control of spin polarized hybrid interface states opens the way to ultrafast spin control at the molecular scale.	UNIKL **Scientific Impact**: found long-lived excitations with coherence times of up to 110fs **Application Impact**: opens the way to ultrafast spin control at the molecular scale.
	Spin-polarization loss at insulator/organic interfaces We have investigate the influence of the tunnel barrier MgO inserted at the interface between the spin injector CoFe and the organic semiconductor C60 by spin-resolved photoemission spectroscopy. At the CoFe/C60 interface the spin polarization persist up to 15nm C60 thickness and decrease linearly with C60 thickness. At the CoFe/MgO/C60 interface, however, we observe a drastic reduction of the spin polarization directly at the interface between C60 and MgO, indicating an enhanced spin-scattering rate at the insulator/organic interface.	UNIKL **Scientific Impact**: MgO barrier strongly reduce the spin transfer efficiency **Application Impact**: Nearly 100% spin transfer – CoFe/ C60 interface is among best candidates for device applications.
	A nonlinear behavior of a logarithmic plot of the PES intensities in the region below E_F show the existence of HIS formed by the hybridization reaction. Using a modified Lambert-Beer law, SP-UPS measurements clearly show differences in the spin down channel just below E_F for the different MPc's and the pure organic system H_2Pc. By using a very recently published model describing the interaction of the carbon p_z orbitals with a FM, the main structures in the spin down channel at 1.1 eV and the structure at 0.3 eV in the spin up channel are attributed to the interaction of the phenyl-ring system with the metal substrate d orbitals. These structures are consistent with calculations which were also made by the partner TCD for the system MPc/Co. The differences for the spin down channel just below E_F are therefore density of states which must be attributed to the metal atom d-states changing the DOS at the Fermi level and still reflects the importance of the geometry of the open shell frontier orbitals in MPc's for the discussion of spin polarization effects at the interface.	UNIKL **Scientific Impact**: quantitative description of hybridized interface states **Application Impact**: Important as characterization method for device interfaces

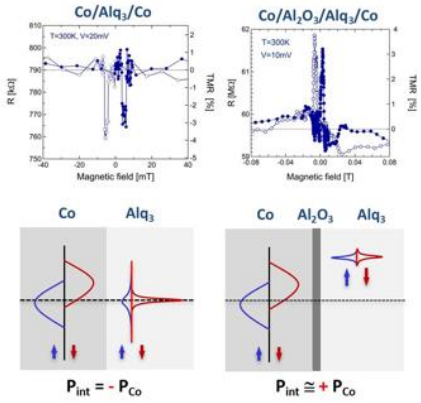
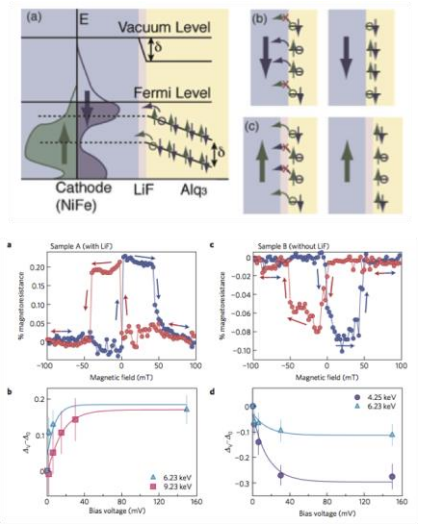
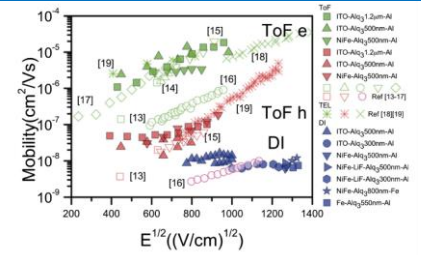
WP3		
Selected results	**Brief description**	**Partners involved**
	In SP-UPS spectra a 1/2 ML of oxygen on the Co(001) surface clearly shows a strong majority polarization vanishing rapidly going to higher oxygen layers. This polarization is also described in DFT GGA+U calculations for a ½ ML on Co. This clearly shows that a very small amount of oxygen is not "magnetically dead". Measurements of the spin polarization for the two archetypical MPc's, CuPc and FePc, show slight differences. The SP-UPS spectra we measure were then correlated with some DFT calculations of the system MPc/CoOx/Co(001) indicating that the differences we investigate matches with two separate interaction mechanisms which were caused by the differences in the geometry of the open shell frontier orbitals of the MPc's central atom and therefor the interaction path. Therefore the results on the MPc/CoOx/Co(001) also reflect the importance of the geometry of the open shell frontier orbitals in MPc's for the discussion of spin polarization effects at the interface.	UNIKL **Scientific Impact**: The strong interfacial effect of oxygen on spin polarization of the injecting surface. Also revealed the importance of the geometry of the frontier orbitals in metal phthalocyanines. **Application Impact**: Important tailoring issues in vertical spintronic devices.
	UPS measurements in cooperation with partner LiU clearly show a charge redistribution seen by the enhancement of work function and a asymmetric behavior of the HOMO and HOMO-1 levels up to the first monolayer. SP-UPS measurements clearly show a spin-splitting of this two MO's. A nonlinear behavior of a logarithmic plot of the PES intensity's in the region below E_F clearly show the existence of HIS formed at the interface. A remaining high intensity in the spin DOS just below E_F furthermore indicates differences in the interaction mechanism with the Co substrate compared to one suggested for the MPc systems. These observations are important comparing them with C_{60} spin valves experiments which have been done.	UNIKL, LiU, NANOG **Scientific Impact**: quantitative description of hybridized interface states **Application Impact**: Important tailoring issues in vertical spintronic devices
	Multifunctional magnetic&electric memory and logic gate Resistive bistability effect in organic (LSMO-Alq3-Co) spintronic devices was put at the basis of new device paradigm featuring both electric and magnetic memory (magnetically enhanced memristor). The device could be set in 32 different and reversible resistive states. The excellent control of the resistance is very promising for memory applications. In addition to memory capability, the device performs as logic gate – two logic gates, AND and IMP, have been experimentally demonstrated. ***Advanced Materials*** *2013, 25, 534–538*	CNR, QMUL **Scientific Impact**: Full electrical control of the magnetoresistance achieved. **Application Impact**: Important input for device paradigms conceptually different from inorganic spintronic devices.
	The absence of Hanle effect in prototypical devices. We investigated the Hanle effect, one of the main outstanding issues in organic spintronics. We have investigated it by measuring the GMR of a prototypical organic spintronic device at different angles between the	CNR, MLU **Scientific Impact**: Crucial achievement questioning most of previously adopted

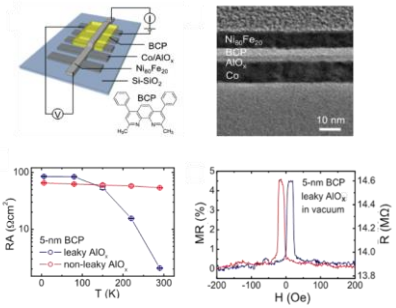
WP3		
Selected results	**Brief description**	**Partners involved**
	device's plane and the magnetic field, and we found no sign of its presence. Although we have no definitive explanation for this finding, an exceptionally high mobility (30 cm^2V^{-1} s^{-1}) would be sufficient to justify the present data. Altogether, these results strongly suggest that the current understanding of transport in organic GMR devices is not sufficiently developed to explain the absence of the observation of spin precession and supports the framework of transport occurring via high mobility, high conductivity channels. ***Appl. Phys. Lett.*** *102, 092407 (2013)*	concepts for spin transport in organic materials. Immediately stimulated an intense discussion. **Application Impact**: Allows to distinguish tunnelling and injection devices.
	Defect role in prototypical Alq3 based devices From the comparison of the electrical resistance of the hundreds of spintronic devices fabricated over the course of the project, two regimes in the Resistance vs Thickness curve could be observed. The high resistance one, with a resistance that is proportional to the thickness of the organic layer, shows no MR; in this case we suppose that transport occurs via the LUMO and/or HOMO levels. Instead, the low resistance regime, highly variable between nominally identical samples, shows MR ; in this case the transport presumably occurs through defects. A meta-anlisys of the data available from the literature for comparable devices, follows the same pattern. Commented in ***Nature Nanotechnology*** *8, 885 (2013)*	CNR **Scientific Impact**: Acquired significant indications for the key role of defects and impurities in the detection of MR in Alq3 based devices. **Application Impact**: Definition of optimal devices resistances and transport modes.
	Dipole layer HIS: work function and spin-polarization We used X-ray Magnetic Circular Dichroism to confirm spin-polarized hybridized ・-orbitals for TNAP/FM and TCBE/FM HOI. The spin-polarized occupied density of states of a particular TCNE/FM HOI, TCNE/Co, was then explored using spin-polarized ultraviolet photoelectron spectroscopy. According to the XMCD results and sum rules, TCNQ and TNAP adlayers have no detrimental influence on the spin polarization of the FM surface whereas AOB adlayers reduce the spin polarization of the FM surface. The results demonstrate that high and low effective work function FM-OS HIS with spin-polarized ・-orbitals at the interface can be achieved but also demonstrates that the OS-FM interaction can negatively impact on the surface spin-polarization of the FM. Nevertheless, the wide range of work functions achievable and the in general favorable magnetic properties make these HOI potentially useful as spin injecting / spin detecting contacts.	LiU, UNIKL **Scientific Impact**: Revealed that TCNQ and TNAP adlayers have no detrimental influence on the spin polarization, while changing significantly the current injection. Vice versa, the AOB adlayers reduce the spin polarization **Application Impact**: Crucial technological information for devise fabrication.
	Spin transfer through self-assembled monolayers in a	CNRS, Thales, UVEG

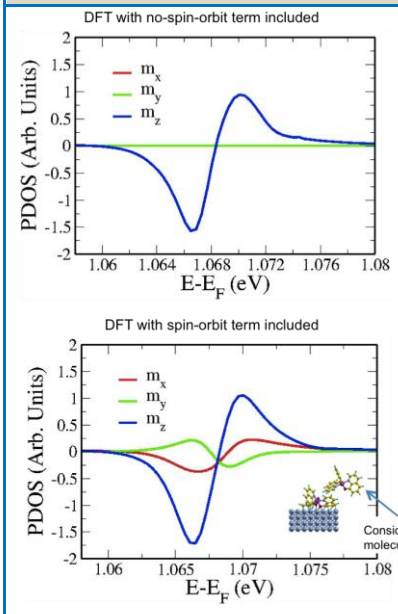
WP3		
Selected results	**Brief description**	**Partners involved**
	nanocontact A lithography process has been developed to fabricate nano-scale vertical systems where molecules are connected to ferromagnetic leads. This technique allows probing HOI interfaces at the nanoscale. Nanolithography based on real time electrically controlled nano-indentation has been used to fabricate LSMO/SAMs/Co magnetic tunnel junctions where SAMs are alkyl-acid phosphonic Self-Assembled Monolayers. Lateral size of the devices can vary from few nm to few tenth nm. Electrical characterizations show that not short-circuited nano-junctions can be achieved. This technique is quite versatile since different kind of ferromagnetic electrodes and molecules can be used. Magnetoresistance signal up to 40% has been measured and is comparable to the best organic spin valves. Hence spin dependent transport reveals an efficient spin transfer at HOI interfaces using Self-assembled monolayers grafted on a ferromagnetic electrode. This shows the potential of SAMs for future chemically tailored and engineered spintronics applications while opening the door to additional molecular electronics functionalities. ***Advanced Materials*** *24, 6429 (2012)*	**Scientific Impact**: Efficient spin transfer at HOI interfaces using Self-assembled monolayers grafted on a ferromagnetic electrode **Application Impact**: This shows the potential of SAMs for future chemically tailored and engineered spintronics applications while opening the door to additional molecular electronics functionalities.
	HOIMs featuring efficient spin transfer at high operation bias voltages Spin transfer at hybrid inorganic/organic interface has been probed by tunnelling magnetoresistance experiments in Self-Assembled Monolayers (SAMs) based magnetic tunnel junctions. The self-assembled monolayers are alkyl phosphonic acids grafted on a half metallic LSMO electrode (D1.2). LSMO/C12PO3H2/Co magnetic tunnel junctions have been fabricated using the nano-indentation technique (D1.6). Figures a-b represent the bias voltage dependence of the tunnel magnetoresistance and two examples of magnetoresistance curves recorded at low (10 mV) and high (4 V) bias voltage. A striking point is the very weak decrease (~25 %) of the tunnel magnetoresistance with the bias voltage. Actually at a voltage as large as 4 V the tunnel magnetoresistance is still about 22%. The high tunnel magnetoresistance ratio at such high bias voltage is a unique feature of these HOI based magnetic tunnel junctions where molecular vibrations plays a crucial and beneficial role since they can short-circuit magnon excitations that usually affect inorganic systems. These measurements demonstrate an efficient spin transfer at these hybrid inorganic/organic interfaces and reveal the potential of SAMs as spin injector working at high bias voltage. This could be a key enabler for future applications such as spin-OLEDs where the spin current is expected to drastically improve the OLED efficiency. ***Advanced Materials*** *24, 6429 (2012)*	CNRS, Thales, UVEG **Scientific Impact**: Efficient spin transfer at HOI interfaces: revealed the potential of SAMs as spin injector working at high bias voltage. **Application Impact**: Possible key enabler for future applications such as spin-OLEDs where the spin current is expected to drastically improve the OLED efficiency.

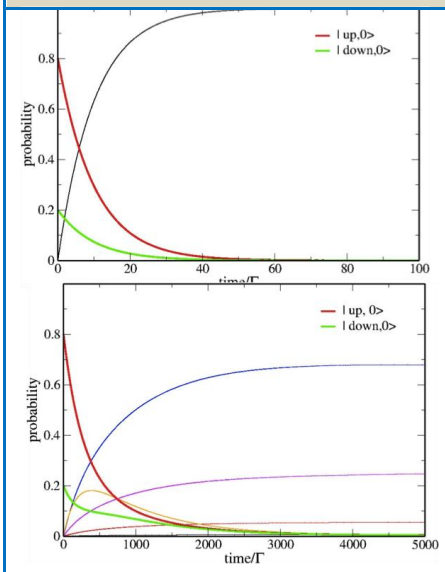
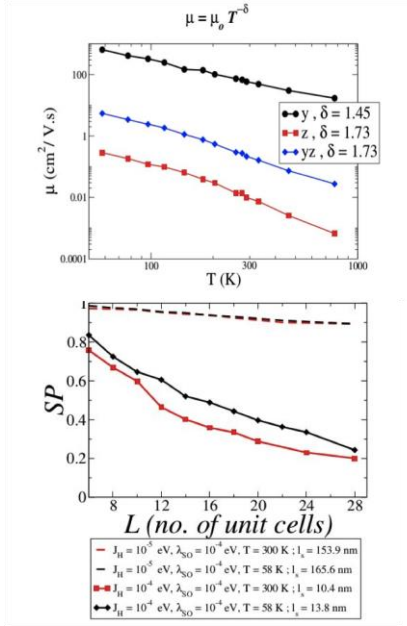
WP3		
Selected results	**Brief description**	**Partners involved**
	Magnetoresistance at high bias voltage in H2PC-based organic spin-valves Magnetoresistance (MR) is observed in vertical organic spin valves consisting of a LSMO and a Co electrode and the metal-free phthalocyanine H2PC. The devices undergo a strong resistance increase (approximately 3 orders of magnitude) during cool down to 4.2K (see Fig. a) indicating that the resistance is dominated by the charge transfer through the H2PC-layer. In addition to the spin-valve signal (see Fig. b) which has a magnitude of ≈8% at low bias and is persistent to bias voltages of up to ±8 V (see Fig. c) we also have identified a sizeable contribution of tunneling anisotropic magnetoresistance (TAMR) to the MR effect (see phiscan measurement in Fig. d). The bias dependence of the TAMR is comparable to this of the spin-valve signal with a maximum of ≈2.5% at 0V. The observation of TAMR suggests that, despite the strong temperature dependence of R, tunneling processes still have a measureable influence on the device resistance and the magnetotransport behaviour in the low bias regime.	MLU **Scientific Impact**: Innovative, very important for the further understanding of the physics behind MR in organic spin valves **Application Impact**: The realization of structures exhibiting MR at bias voltages in the > ±3V regime basically is mandatory for a successful implementation in applications
	Magnetoresistance up to 3-4 percent was established at voltages as high as 11 V, exceeding by far the HINTS objective of 3-5 V. Noteworthy this magnetoresistance was detected in OLED devices at currents and voltages corresponding to light emission. The result opens the possibility to promote efficient studies of the capability to modify light emission in organic based LEDs by spin polarized injection.	UVEG, CNR **Scientific Impact**: A different type of multifunctional devices: magneto-optical. HOI with high voltage operation demonstrated. **Application Impact**: Spin polarised injection is expected to improve OLEDs efficiency (double for singlet emission)
	Outstanding magnetic modulation of the electroluminescence was achieved in OLEDs with two spin polarized electrodes.	UVEG, CNR **Scientific Impact**: Hints for both light emission physics and spintronic effects. **Application Impact**: Possibility to combine magnetic and optical writing and reading of information. Increased OLED efficiency (see above)

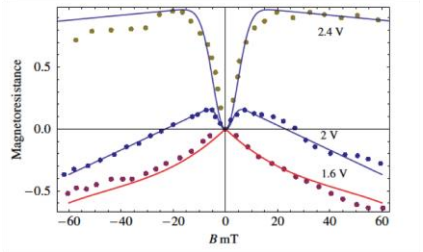
WP3		
Selected results	**Brief description**	**Partners involved**
	Lateral organic spin-valves fabricated by shadow evaporation A novel fabrication process has been developed, improved and established that allows for the in-situ fabrication of lateral organic spin valves with a channel length in the sub-100nm regime. The process' key step is a shadow evaporation process which is illustrated in Fig. a and b. Preliminary experiments have been undertaken in order to verify that all requirements for spin-valve functionality are met, e.g. different coercive fields of the two electrodes (see MOKE measurements in Fig. c). The contacts' separation has been checked by imaging methods (see Fig. d) and indirectly by transport measurements. In devices employing the organic semiconductor N,N'-bis(Heptafluorobutyl)-3,4:9,10-Perylene Diimide (PTCDI-C4F7) we have measured a spin-valve-like magnetoresistance effect of up to ≈50% (see Fig. e and f) at room temperature which can be explained by lateral tunneling. ***Organic Electronics*** *14, 2082 (2013)*	MLU **Scientific Impact**: devices which do not suffer from side effects like a reduction of the organic interlayer's thickness **Application Impact**: realization of lateral spin-valve structures is an important step towards the implementation of non-volatile switching to the established organic field effect transistor technology
	Resistive switching in AlQ3-based TAMR devices A resistive switching (RS) effect going beyond common bipolar switching has been observed in AlQ3-based single-sided vertical spin valves (tunneling anisotropic magnetoresistance, TAMR, structures with only one ferromagnetic LSMO electrode). The RS (see Fig. a) is initiated by short voltage pulses and allows for setting the device resistance in the range between ≈1kΩ (base resistance state, BRS) and a maximum of ≈120kΩ (high resistance state, HRS). Magnetotransport measurements have been performed in this resistance range revealing a strong increase of the TAMR magnitude when the device resistance is increased (Fig. b). Based on the results of further studies (Simmons analysis of I/V characteristics, see Fig. c and d) a modification of the tunnel barrier which is located between the LSMO electrode and the AlQ3-layer can be identified as the origin of the MR effect's enhancement. Furthermore, among other experiments, a similar analysis has been undertaken for a complete RS cycle in order to investigate the barrier parameters' dynamics caused by the applied voltage pulses (Fig. e). In all results of I/V curve analysis an increase/decrease in barrier thickness/height (dbarrier/ΦΦ0) with increasing device resistance (and vice versa) can be discerned suggesting very basic mechanisms behind the RS, which very likely are creation, motion and removal of oxygen vacancies at the LSMO electrode's surface.	MLU **Scientific Impact**: TAMR can be employed as a powerful tool for the investigation of interfaces and interface-related effects **Application Impact**: realization of another class of promising multifunctional devices
	Spin transfer sign modification at a selected tailored HOI interface at room temperature We developed organic spin valves relying on	CNRS, Thales **Scientific Impact**:

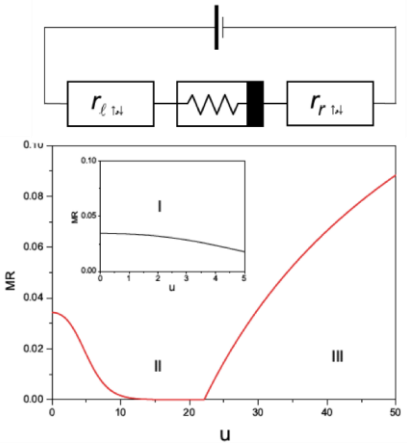
WP3		
Selected results	**Brief description**	**Partners involved**
	conventional metallic ferromagnetic electrodes (Co, Fe,Ni…) having high Curie temperature well above room temperature. Co/Alq3/Co organic spin valves were fabricated in-situ by shadow mask. Inverse magnetoresistance was obtained at room temperature. This was ascribed to a strong hybridization (HOI) sustaining up to room temperature as an inverse magnetoresistance in spin valves with identical ferromagnetic electrodes implies that the spin polarization is inverted at one of the two interfaces. This was further confirmed as, by inserting a tunnel barrier at the bottom interface to suppress the hybridization (HOI), normal magnetoresistance was then observed. This demonstrates that the hybridization is strong enough to be observed at room temperature and unveils the potential of HOI for room temperature applications.	Demonstrated that the hybridization is strong enough at room temperature **Application Impact**: Potential of HOI for room temperature applications.
	Control spin polarisation of extracted holes by inclusion of interfacial layers VLS modifies the energy of the HOMO/LUMO with respect to the ferromagnet. This changes the spin polarisation of extracted charge carriers at that interface ***Phys. St. Sol. B** 2012*	QMUL **Scientific Impact**: Revealed the role of interface energetics on spin transfer at HOI. **Application Impact**: Provides strong indications for the most efficient interfacial engineering of devices.
	Direct evidence that transition metal FMs are hole injectors/extractors and that the lower hole mobility isn't the limiting factor in organic spin valves - Mobility of holes ~50 times smaller than electrons. - Not limiting factor in spintronic devices, if it is possible to inject only holes at FM-Alq3 interfaces. ***APL 2014***	QMUL **Scientific Impact**: Most deep investigation on the mobility effects in HOI based spintronic devices **Application Impact**: Key information for the control of mobility in devices.
	Room temperature spin transport in organic molecules with hopping charge transport and air stability Produced and characterized spin valves based on the organic semiconductor Bathocuproine (BCP). In two sets of devices, different AlO_x seed layers have been employed, that we distinguish between "leaky" and	NANOG **Scientific Impact**: Modification of the tailoring oxide layer allows to modify internal interfacial structure.

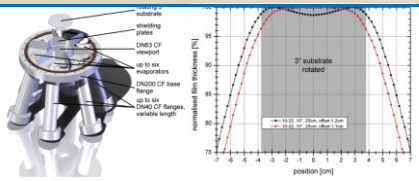
WP3		
Selected results	**Brief description**	**Partners involved**
	"non-leaky" on the basis of the temperature dependence of their resistance. For the devices with non-leaky seed layer, the main charge transport mechanism is tunneling, and consequently MR is measured only for extremely thin BCP films (5 nm). By contrast, for devices with leaky AlO_x layer, the transport takes place into the BCP film, featuring an exponential increase of the resistance characteristic of hopping transport. In these devices, a sizable MR is measured up to a thickness of 60 nm. Finally the BCP-based SVs have shown excellent air-condition stability in terms of device performance even after long time (more than 70 days), outperforming most of the reported organic spin valves. ***Nature Communications*** *4, 2794 (2014)*	**Application Impact**: The observation of air-stable room-temperature spin transport in BCP-based SVs is of great importance for the future industrial interest in organic spintronics considering cheap (non UHV) technologies.

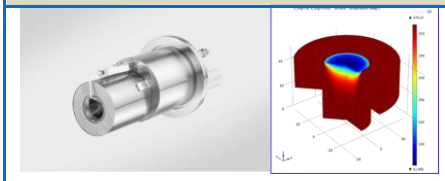
WP4		
Selected results	**Brief description**	**Partners involved**
	Enhanced spin-orbit coupling in molecules at the interface with a ferromagnetic metal. For the interface between fcc Co(001) and Alq3, we have found (through density functional theory calculations) a small, but still non-zero, spin-polarization induced even on molecules very weakly coupled to the surface. This is shown in the left panel of the picture, where the spin-resolved density of states (DOS) for the LUMO of an Alq3 molecule is displayed. Therefore, we infer that spinterface effects are non-negligible also for molecules in the second layer of an organic film deposited on a ferromagnetic metal. Even more interestingly, we have found that the DOS presents comparable non-collinear components when the spin-orbit coupling is explicitly included in the calculation (right panel of the picture). As the Co(001) is a surface with a relatively large spin-orbit coupling strength (in fact spin hot spots have been extensively studied for this surface), the small hybridization is able to enhances the spin-orbit coupling strength in the molecule itself (we note that the intrinsic spin-orbit coupling strength of gas-phase Alq3 is so small that can not even be numerically resolved in calculations). In future, more systematic studies for different class of molecules may be performed.	TCD, UNIKL **Scientific Impact**: Elucidates the enormous role of the spin-orbit coupling at HOI interfaces. **Application Impact**: Promotes routes for the modification of magnetic anisotropy and other magnetic parameters in thin ferromagnetic films by deposing top organic layers- mild engineering of key magnetic properties.

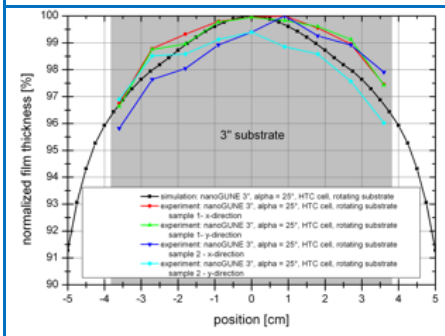
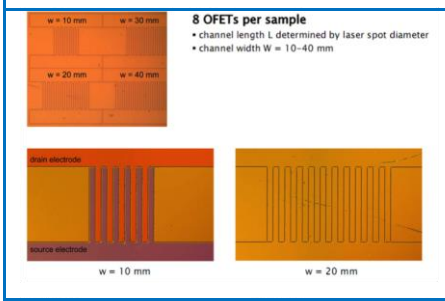
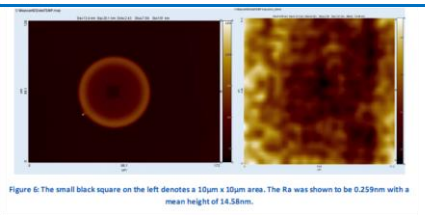
WP4		
Selected results	**Brief description**	**Partners involved**
	Spin-relaxation mechanisms at the interface. Several models describing spin-relaxation mechanisms at hybrid interfaces have been investigated during the project. To our knowledge, no previous study has ever addressed this problem from a microscopic point of view, while most of the research efforts have been dedicated to understand spin relaxation in bulk organic semiconductors. Here, we have shown that the spin-relaxation dynamics for an electron transfer process through an interface can be very complex, even in the absence of spin-orbit and hyperfine interaction. For example, the electron-vibron coupling can lead to charge trapping in the organic right at the interface. Then the net spin polarization of the trapped electrons decays to zero way before these electrons pass through the interface. The two graphs display the time evolution of the spin-dependent occupation probability of a molecular state coupled to a metal. For zero electron-vibron coupling, this probability decays with a constant determined by the coupling with metal. In contrast, when the electron-vibron coupling is non-zero, the decay becomes several orders of magnitude slower, while at a characteristic time (indicated by the arrow) the net spin-polarization becomes zero. We think that, in future, more studies should be devoted to unravel the spin-relaxation mechanism directly at the interface.	TCD **Scientific Impact**: Deep and new knowledge in relation to spin-relaxation processes. **Application Impact**: Significant step towards the control of spin transport in future devices.
	A multiscale theoretical scheme to compute material-specific charge and spin transport properties of organic semiconductors has been developed. This scheme has been extensively applied in order to study crystalline rubrene. Highly anisotropic transport properties have been found (left panel of the picture) and, moreover, the obtained value for the charge carrier mobility is in good agreement with the highest estimate, which was reported in experiments. Furthermore, we could compute the spin-relaxation length (right panel of the picture). By including both the spin-orbit and the hyperfine interaction, a good agreement between our computed value and the experimental estimate has been achieved. More importantly, the spin-diffusion length ls is found to be independent on the temperature for zero-spin orbit coupling. In contrast ls decreases with the temperature when the spin-orbit coupling is not neglected. Our results then suggest that the analysis of the temperature dependence of the spin-diffusion length can be used as a mean to investigate the relative importance of the spin-orbit coupling and of the hyperfine interaction in the spin transport properties of (crystalline) organic semiconductors. This would finally help to address the long-debated issue about the origin of spin-relaxation	TCD **Scientific Impact**: Developed the most advanced multiscale theoretical scheme able to compute charge and spin transport properties in HOI and organic materials. **Application Impact**: Important step towards the "on need" developed and fabricated materials for Spintronics.

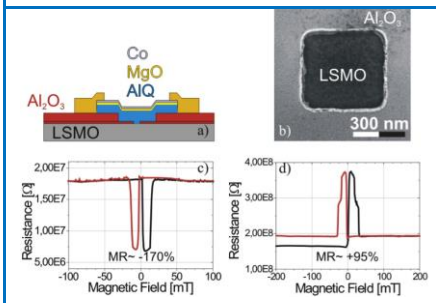
WP4		
Selected results	**Brief description**	**Partners involved**
	in organic materials.	
FIGURE CONFIDENTIAL	Moving beyond the ferromagnetic electrodes' age: exploring novel materials Until recently, most of the studies in organic spintronics have investigated hybrid interfaces between ferromagnetic metal and organic semiconductors. Usually, a hybrid interface is engineered through a careful selection of the organic molecules. Here, instead, we have investigated theoretically (by mean of density functional theory calculations) the impact of different classes of inorganic materials. For example, we have considered the interface formed by absorbing different molecules on the 3D topological insulator, Bi2Se3. We have found three different physical scenarios, exemplified in the picture by plotting the (molecule and surface) density of states (DOS) resolved in reciprocal space. For weakly coupled molecules (top panel), no change in the electronic structure neither of Bi2Se3 nor of the molecule is seen. For molecules in an intermediate coupling regime (central panel), the electronic structure of Bi2Se3 is unchanged, while a hybrid interface state appears. Finally, for the case of strongly coupled molecules, Bi2Se3 still preserves its topological nature although the electronic structure changes visibly. Furthermore, and more importantly, the typical features of the topological insulator are seen also on the molecule DOS. The first two scenarios (weak and intermediate coupling) have been observed also experimentally by UNIKL. For the third case, an experimental proof is not available yet. Finally, we think that, if a suitable molecule able to form a strong chemical bond with Bi2Se3 was identified, a novel hybrid interface could be made thus opening the route to completely unexplored applications for spin-injection /detection .	TCD, UNIKL **Scientific Impact**: Extremely innovative knowledge on the use of topological insulators in spintronics. **Application Impact**: Step towards new, naturally cheaper electrodes (rare earth free)
$MR = \frac{-B/B_m + \eta[1-\exp(-B^2/B_s^2)]}{1 + B/B_m + \eta\exp(-B^2/B_s^2)}$, 	Hopping Magnetotransport via Nonzero Orbital Momentum States and Organic Magnetoresistance The theory of hopping magnetoresistance was extended to states with nonzero orbital momenta. Different from s states, a weak magnetic field expands the electron (hole) wave functions with positive magnetic quantum numbers, m>0, and shrinks the states with negative m in a wide region outside the point defect. This together with a magnetic-field dependence of injection/ionization rates results in a negative weak-field magnetoresistance, which is linear in B when the orbital degeneracy is lifted. The theory provides a possible explanation of a large low field magnetoresistance in disordered conjugated organic materials. ***PRL*** *108, 186601 (2012)*	JSI, CNR **Scientific Impact**: Revealing the presence of magnetoresistance in hopping transport in general. **Application Impact**: Enabling possible field dependent correction in devices based on hopping conductivity.

WP4		
Selected results	**Brief description**	**Partners involved**
	Magnetoresistance in organic spintronic devices: the role of nonlinear effects. A full set of kinetic equations was derived describing injection and transport of spin polarized carriers in organic semiconductors with hopping conductivity via an impurity level. The model predicts a strongly voltage dependent magnetoresistance defined as resistance variation between devices with parallel and antiparallel electrode magnetizations (spin valve effect). Namely, the voltage dependence of the magnetoresistance splits into three distinct regimes. The first regime matches well known inorganic spintronic regimes, corresponding to barrier controlled spin injection or the conductivity mismatch case. The second regime at the intermediate voltages corresponds to strongly suppressed magnetoresistance. The third regime develops at higher voltages and accounts for a novel and purely organic paradigm. It is promoted by strongly non-linear effects in organic semiconductor which strength is characterized by the dimensionless parameter eU/kBT. This nonlinearity, depending on device conditions, can lead to both significant enhancement or to exponential suppression of the spin-valve effect in organic devices. *Paper submitted 2014*	JSI, CNR **Scientific Impact**: Conceptually new approach proposed to circumvent conductivity mismatch problem in spintronics by making use of non-linear carrier transport. Fully applicable to organic and HOI cases. Provides explanation of high voltage magnetoresistance. **Application Impact**: Significant step towards a quantitative description of HOI spintronic devices with electrical injection.

WP5		
Selected results	**Brief description**	**Partners involved**
	Two flanges dedicated to the efficient evaporation of organics The flanges are easy to implement in an existing UHV system. Both provide a film thickness uniformity better than ± 2 % on 3 inch substrates. One flange is dedicated for the evaporation of organics only and has an outstanding material utilization efficiency of 15 %. Using this flange for the evaporation of metals, which usually have a higher evaporation temperature, increases the temperature of the substrate. This increase might destroy organic films, which were prior evaporated to the substrate. Hence the second flange has a larger crucible-substrate distance and thus is also suitable for the evaporation of metals. Due to larger crucible-substrate distance the material utilization efficiency is only 6.5 % on 3 inch substrates.	MBE-K, CNR, NANOG **Application Impact**: Significant improvements to available commercial solutions

WP5		
Selected results	**Brief description**	**Partners involved**
	OME 100 Effusion Cell The OME 100 Effusion Cell is an advancement of the OME evaporators. It dedicated to the evaporation of sensitive organic materials on large spherical calottes (Ø ~ 1 m) which are often used in the industrial environment. Due to the large substrates the orifice of the evaporator needs to be large. Besides evaporating the organics from a quartz liner it is possible to evaporate it directly from the copper crucible. The copper crucible can be plated with nickel, gold or silver. Evaporating directly from the copper crucible increases the thermal flow into the organic material. An additional thermocouple positioned in crucible makes it possible to directly measure the temperature of the organic material.	MBE-K **Application Impact**: The development of the effusion cell is finished and some evaporators are already in use. TRL 6-7
	OME 63 Effusion Cell Like the OME 100 the OME 63 is an advancement of the OME evaporators. It has been developed and build for customers, who evaporate sensitive organics to large substrates (diameter of a few cm) and need a large amount of organics. The effusion cell can be used both for research purposes and industrial applications. The development of the effusion cell is finished and some evaporators are already in use.	MBE-K **Application Impact**: The development of the effusion cell is finished and some evaporators are already in use. TRL 6-7
	Thermostar A big difference between the evaporation of organics and metals is the usually much lower thermal conductivity of the organic material. In combination with a large orifice this might lead to a strong temperature gradient within the organic material. While the outer molecules in direct contact with the crucible evaporate with an acceptable rate the rate strongly decreases for molecules in the inner part of the crucible. Therefore the total rate is much lower as possible and also the danger of decomposition of the organics is much higher due to the high gradient of the temperature within the crucible. To increase the thermal conductivity within the organic material the Thermostar was invented. The Thermostar is build of copper sheets arranged in a star shape. The copper sheets can be plated with different materials like gold, nickel and silver. The Thermostar needs to fit to the inner shape of the crucible and the normally used maximum filling level.	MBE-K, MLU **Application Impact**: Fabricated an insert to standard commercial crucibles allowing to decrease internal temperature gradients and enhance effusion homogeneity. TRL 5-6
	Customized OME 40 effusion cells for CNR-ISMN To optimize the evaporation setup the CNR-ISMN is using for the evaporation to 1 x 1 cm^2 substrates several simulations were carried out. Based on the results two customized OME 40 effusion cells were built for the CNR-ISMN. By reducing the crucible-substrate distance and using a conical crucible the film thickness uniformity could be kept at 95% while increasing the	MBE-K, CNR **Application Impact**: Performed the customisation of the commercial cell OME40 aiming at more efficient use of the filling material.

WP5		
Selected results	**Brief description**	**Partners involved**
	material utilization efficiency from 0.34% to 1.07%. The development of the customized OME 40 is finished and the CNR-ISMN is using the two build evaporators.	Applicable for the case of low amounts of starting material. TRL 4-5
	Simulation: selection of the setup used for the evaporation on 3" substrates For the evaporation of organics on 3" substrates the partner nanoGUNE had to choose between two evaporation setups. With the help of the simulation of these two setups it was possible to choose the evaporation process suitable for their application without performing time-consuming experimental tests. Using the chosen evaporation setup three 3" substrates were coated with C60 and subsequently analyzed with ellipsometry. Simulation and experiment were in very good agreement.	MBE-K, NANOG **Application Impact**: Brings high quality HOI interface protocols to 3" substrate growth setups.
	As part of the HINTS project M-Solv has focused on developing a machine for depositing solution based OSC molecules in an inert environment. The MGB-601 has been built and tested using inkjet and ultrasonic spraying methods for solution deposition. Novel material handling methods have been developed to enable the use of ink jet print heads inside a glove box. And as a consequence the tool offering capability of M-Solv has been increased.	M-SOLV **Application Impact**: M-Solv has increased the TRL of the tehcnology to 7 and above and this has lead to a sale worth EUR 500k to a top 4 world ranking university, of a mulit-head spray deposition system in a glove box.
	By demonstrating that it is possible to pattern sub micron films and stop on a specified layer, it is possible to pattern thin film devices through laser processing only. This is industrially relevant as it reduces the number of masks required and associated alignment for each subsequent layer. Therefore manufacturing costs are reduced.	M-SOLV, MLU **Application Impact**: By reducing the manufacturing costs the TRL of this process has moved to TRL 5/6 from 2.
	Ink jet printing: As part of the project M-Solv developed methods for using ink jet printing processes for precise deposition of materials. Both for discreet formation and also for uniformity of deposited films. Novel process regimes had to be developed so that a thin layer <100nm could be achieved over a 10um x 10um area that would be suitable for device fabrication. It has been shown that ±3um in dimensional accuracy can be achieved along with thickness regimes of <20nm with a sub nm roughness. Therefore ink jet has the potential to make functional layers with the required surface roughness and thickness uniformity. The process relies heavily on the ink – surface	M-SOLV, UVEG **Scientific Impact**: Found the wetting requirements for achieving the high uniformity **Application Impact**: Compatibility between some spintronics materials and ink jet technology

WP5		
Selected results	**Brief description**	**Partners involved**
	interaction and how it wets.	demonstrated.
	Organic spin valve with lateral dimensions in the sub-500nm regime A fabrication process for vertical organic spin-valve devices was developed and tested to achieve active device areas of less than 100x100 nm^2 and which is flexible in terms of material choice for the active layers. The fabricated samples consist of the layer stack LSMO/AlQ3/MgO/Co and the active area is defined by insulating Al2O3 (Fig. a). Several samples with an active area of about 500x500nm^2 have been fabricated and in Fig. b) a SEM image of the active area is shown. Along more than 10 samples each with 7 devices a variety of MR results has been measured. Two examples are shown in Fig. c) and d) where a negative MR effect of about -170% and a positive effect of about +95% has been observed in two different samples with an AlQ3 thickness of 12 nm.	MLU **Scientific Impact**: Reveals the physics in vertical organic spin-valves as, for instance, the occurrence of pinholes gets less probable in smaller devices **Application Impact**: development of a fabrication process employing lithography is an important step towards the 'mass production' of organic spintronics devices

WP6		
Selected results	**Brief description**	**Partners involved**
	The investigation on the assessment of new processing technologies has been performed. The main HINTS scientific achievements during the whole project duration and the best materials to fabricate the hybrid interfaces have been collected.	Thales, CNR

The potential impact and the main dissemination activities and exploitation of results

The potential impact of the HINTS achievements can be evaluated as extremely high.
One of the main achievements of the proposal is the control of the sign of spin transferred polarization. The strength and especially the versatility of this effect in HOI is by far higher than analogue effect detected in inorganic spintronics. The sign inversion gives a magnetoresistance modification >100%, what is clearly appealing for device applications. Furthermore, the electrical modulation of the sign has no precedents in inorganic spintronics, and can be at the basis of innovative reconfigurable logic elements.
It can be expected that the extremely efficient control of the spin polarization sign at HOI interfaces may be transferred even into inorganic device area. The rationale for this is supported by the high structural, temperature and chemical stability of the first 1-2 monolayers of organic materials grown on metals or oxides. This option, on the other hand, would not be compatible with inorganic devices requiring epitaxial growth conditions.
The advancement of the spin dependent residence time at the interface and "inside" it (HINTS knowledge and know-how) represents a new way to quantify the spin filtering capability. It has the potential to become the parameter of the future devices based on HOI as well as it can be used in recent close-to-market inorganic devices.
HINTS has established the phenomenological criteria for the detection of the magnetoresistance in HOI based devices, providing thus means for the fabrication of laboratory and industrial devices with desired values of magnetoresistance.
One of the highest impact results is the realization of high voltage operated magnetoresistance. This opens the possibility to use spin polarized carriers at the light emitting voltages in OLEDs or at the operating voltages of OFETs. Thus the organic spintronics can enter for the first time in these two ICT applications, widely employed in display and lightening industries.
Moreover, the achievement of first promising results for the transfer of spintronic achievements on flexible substrates promotes the application of most or part of HINTS results in Large Area Flexible Organic electronics (TOLAE).
Finally, high TRL values have been reached in the tasks involving both research and industrial partners. Two equipment producing partners succeeded to develop useful modifications to their commercial products (at least TRL 6) as stimulated by the needs of HINTS requirements to the interface.

The address of the project public website, if applicable as well as relevant contact details

The HINTS project is present on the web thanks to its official website: **www.hintsproject.eu**. The website contains the full description of the Project, of its consortium and described the results achieved. Moreover, an intranet has been developed only for the members of the consortium, where they can find the documentation produced during the Project lifetime.
The website will be kept alive on the web for other five years after the end of the project.
The main contacts are listed in table below.

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2. Use and dissemination of foreground

This section includes two tables including all the dissemination actions performed in terms of publications and articles published, and in terms of conferences attended by the partners. Specifically, you will find:

> **Table A1:** List of all scientific (peer reviewed) publications relating to the foreground of the project.
> **Table A2:** List of all dissemination activities (publications, conferences, workshops, web sites/applications, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters).

These tables show all publications and activities from the beginning until after the end of the project. Before introducing the two tables, a qualitative analysis to evaluate the dissemination performed during the entire lifetime of the project has been performed. The results of the assessment are depicted in the graphs and tables below, which are the results of an analysis in terms of quantity, kind of dissemination activities performed and reporting period.

Let's proceed with the dissemination analysis of the first period. In the graph below, the dissemination activities with the highest percentage are those related to the participation on conferences and events (50%) and those related to the workshops' participation (11%). Considerable also is the organisation of workshops (3%) and other dissemination activities participation as for example the publication and press of an article/publication (6%). Instead less influential is the organisation of conferences, events and summer schools' participation (2%). Finally, publications is the second favoured channel to promote the work performed and the results achieved (26%).

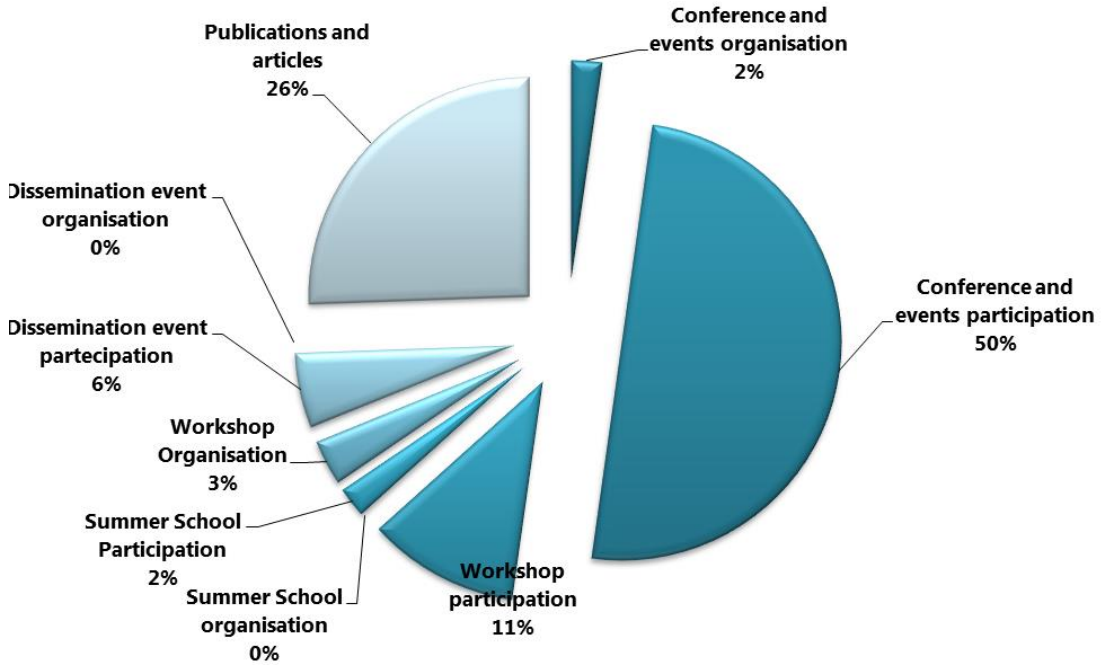

Figure 1- *Dissemination activities performed during the I reporting period*

	Quantity	%
Conference and events organisation	2	2%
Conference and events participation	45	50%
Workshop participation	10	11%
Summer School organisation	0	0%
Summer School participation	2	2%
Workshop organisation	3	3%
Dissemination event participation	5	6%
Dissemination event organisation	0	0%
Publications and articles	23	26%
Totals	90	

Table 1- *Quantity of dissemination activities performed in the I reporting period*

While, considering the second period, the kind of dissemination activities in which the partners have been more active remain the same of the first period: participation in conferences and events (33%) and workshops' participation (19%). Also during the second reporting period, the workshops' organisations reveal a substantial influence (4%). Moreover, less influential is the organisation of conferences, events and summer schools' participation (3%). Finally, also in the second period, publications is the second favoured channel in which HINTS consortium put a relevant effort in promoting and disseminating its results (39%).

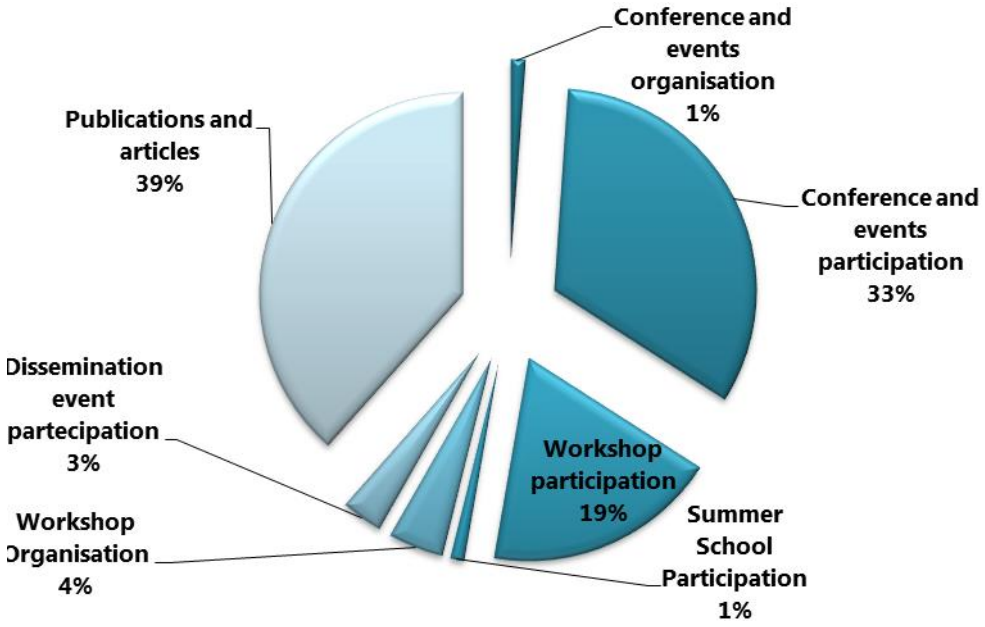

Figure 2- *Dissemination activities performed during the II reporting period*

	Quantity	%
Conference and events organisation	1	1%
Conference and events participation	30	33%
Workshop participation	17	19%
Summer School organisation	0	0%
Summer School participation	1	0%
Workshop organisation	4	4%
Dissemination event participation	3	0%
Dissemination event organisation	0	0%
Publications and articles	35	38%
Totals	**91**	

Table 2- *Quantity of dissemination activities performed in the II reporting period*

Concluding, the dissemination performed in terms of quantity and kind of activities, is well distributed during the whole course of the project as shown in the figure and in the table below. The kind of dissemination activities in which HINTS partners have been more active is the participation at conferences and other international events, during which the project has been disseminated, as well as the participation at workshops. While publications remains the second favoured channel to promote the work performed and the results achieved.

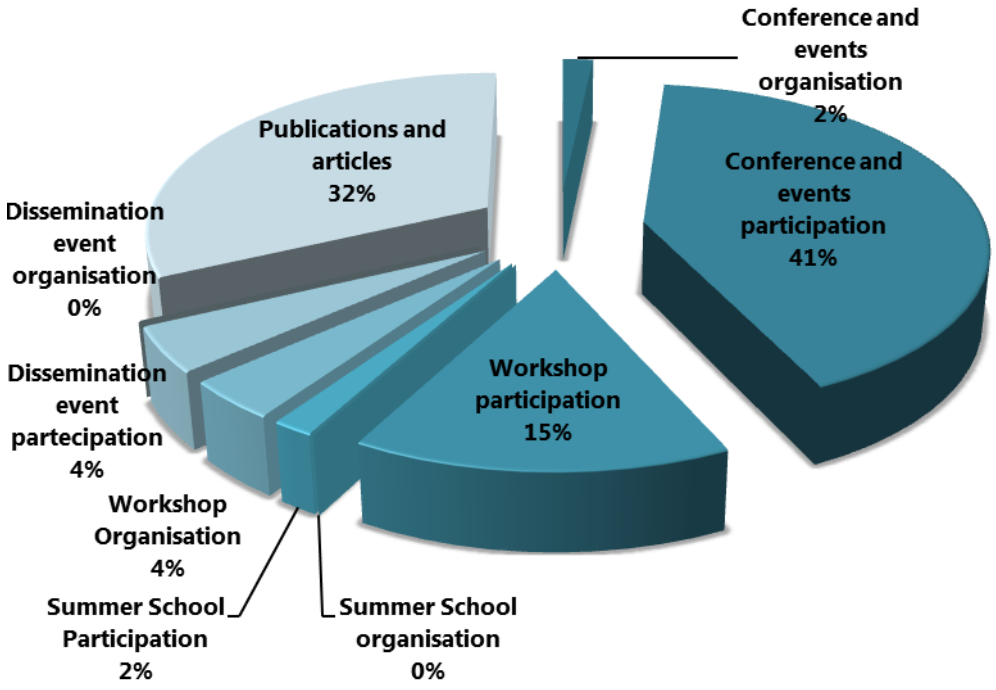

Figure 3- *Dissemination activities performed during the whole course of the project in terms of %.*

	Quantity	%
Conference and events organisation	3	2%
Conference and events participation	75	41%
Workshop participation	27	15%
Summer School organisation	0	0%
Summer School participation	3	2%
Workshop organisation	7	4%
Dissemination event participation	8	4%
Dissemination event organisation	0	0%
Publications and articles	58	32%
Totals	**181**	

Table 3- *Quantity of dissemination activities performed in the whole course of the project*

HINTS succeeded to establish an impressive list of publications: while a number of papers is still under considerations in various journals and other papers are in preparation, about 58 papers have been published in peer reviewed journals generally with medium, high or very high impact factors. Among these 7 articles published in the Nature Publishing Group, 5 in Advanced Materials and Advanced Functional Materials, and other very important journals such as Chemical Society Reviews, ACS Nano, PRL, MRS Buletin, Nanoscale etc. HINTS publications have attracted a considerable attention of the spintronic and magnetic communities and promoted seminal role in a number of topics, stimulating new research and application interests. Thus, revealing internal interface spin related properties has brought the understanding of interfacial spintronics well beyond the state of the art and even beyond the project expectation. It definitely put Europe in the clear leading role worldwide in spintronic interfacial research. The discovery of the lacking Hanle effect has stimulated a very intense theoretical and experimental research and has the chance to reveal conceptually new effects and device paradigms. Cheap fabrication technologies have been for the first time so massively investigated for organic spintronic devices – and this has been convincingly disseminated and publicized, where available.

Table A1- *List of all scientific (peer reviewed) publications relating to the foreground of the project*

TABLE A1: LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS, STARTING WITH THE MOST IMPORTANT ONES										
NO	**Title**	**Main author**	**Journal**	**Num. date or frequency**	**Publisher**	**Place of publication**	**Year of pub.**	**Relevant pages**	**Permanent identifiers[3]**	**Open access[4]**
1	**Spin-dependent trapping of electrons at spinterfaces**	Steil, S., Großmann, N., Laux, M., Ruffing, A., Steil, D., Wiesenmayer, M., et al.	Nature Physics	Volume 2013, Issue 9 (4), 17/02/2013	Nature Publishing Group	--	2013	242–247	10.1038/nphys2548	No
2	**Determination of energy level alignment at metal/molecule interfaces by in-device electrical spectroscopy**	M. Gobbi, L. Pietrobon, A. Atxabal, A. Bedoya-Pinto, X. Sun, F. Golmar, R. Llopis, F. Casanova & L. E. Hueso	Nature Communications	5, 20/06/2014	Nature Publishing Group	--	2014	--	10.1038/ncomms5161	No
3	**Room-temperature air-stable spin transport in bathocuproine-based spin valves**	Xiangnan Sun, Marco Gobbi, Amilcar Bedoya-Pinto, Oihana Txoperena, Federico Golmar, Roger Llopis, Andrey Chuvilin, Fèlix Casanova & Luis E Hueso	Nature Communications	Volume 4 Art number: 2794	Nature Publishing Group	--	2013	--	doi:10.1038/ncomms3794	Yes
4	**Organic spintronics: Inside the interface**	V. Alek Dediu	Nature Physics	109, 17/02/2013	Nature	--	2013	210–211	doi:10.1038/nphys2569	No

[3] A permanent identifier should be a persistent link to the published version full text if open access or abstract if article is pay per view) or to the final manuscript accepted for publication (link to article in repository).
[4] Open Access is defined as free of charge access for anyone via Internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

5	**Tuning the magneto-structural properties of non-porous coordination polymers by HCl chemisorptionr**	E. Coronado, M. Giménez-Marqués, G. Mínguez Espallargas, L. Brammer	Nature Communications 3	Volume 2012, Issue 828 (3), 08/05/2012	Nature Publishing Group	--	2012	2041-1723	10.1038/ncomms1827	Yes
6	**More than Spectroscopy**	V. Alek Dediu and Alberto Riminucci	Nature Nanotechnology 8	04/12/2013	Nature Publishing Group	--	2013	885	doi:10.1038/nnano.2013.263	No
7	**Unveiling Self-Assembled Monolayers' Potential for Molecular Spintronics: Spin Transport at High Voltage**	Marta Galbiati from CNRS, Clément Barraud, Sergio Tatay from CNRS, Karim Bouzehouane, Cyrile Deranlot, Eric Jacquet, Albert Fert, Pierre Seneor from CNRS, Richard Mattana from CNRS, and Frédéric Petroff	Advanced materials	Volume 24, Issue 43, 11/10/2012	Wiley - Online libraries	www.advmat.de	2012	--	http://onlinelibrary.wiley.com/doi/10.1002/adma.201203136/abstract	No
8	**Magneto-Optical Properties of Electrodeposited Thin Films of the Molecule-Based Magnet Cr5.5(CN)12•11.5H2O**	E. Coronado, M. Makarewicz, J.P. Prieto-Ruiz, H. Prima-García, F.M. Romero	Advanced Materials	23 / 37, 10/08/2011	Wiley-VCH Verlag	--	2011	4323 - 4326	10.1002/adma.201101513	No
9	**A Single-Device Universal Logic Gate Based on a Magnetically Enhanced Memristor**	Mirko Prezioso,* Alberto Riminucci, Patrizio Graziosi, Ilaria Bergenti, Rajib Rakshit, Raimondo Cecchini, Anna Vianelli, Francesco Borgatti, Norman Haag, M. Willis, Alan J. Drew,	Advanced Materials	25/01/2013	WILEY-VCH Verlag	--	2013	534-538	10.1002/adma.201202031	No

		William P. Gillin, and Valentin A. Dediu								
10	**Hopping magneto-transport via nonzero orbital momentum states and organic magnetoresistance**	Alexandre S. Alexandrov, Valentin A. Dediu, Victor V. Kabanov	Physical Review Letters	108, 22/10/2011	Materials Science	http://arxiv.org/abs/1110.4979	2011	186601	/	No
11	**Metal–Organic Hybrid Interface States of A Ferromagnet/Organic Semiconductor Hybrid Junction as Basis For Engineering Spin Injection in Organic Spintronics**	Stefan Lach from UNIKL, Anna Altenhof, Kartick Tarafder, Felix Schmitt, Md. Ehesan Ali, Michael Vogel, Jens Sauther, Peter M. Oppeneer, and Christiane Ziegler from UNIKL	Advanced functional materials	Volume 22, Issue 05/03/2012	Wiley – On line library	www.afm-journal.de	2012	Pages 989–997	http://onlinelibrary.wiley.com/doi/10.1002/adfm.201102297/abstract DOI: 10.1002/adfm.201102297	No
12	**Self-Assembled Monolayer Functionalized Half-Metallic Manganite for Molecular Spintronics**	Sergio Tatay, Clément Barraud, Marta Galbiati, Pierre Seneor, Richard Mattana from CNRS, Karim Bouzehouane,Cyrile Deranlot,Eric Jacquet, Alicia Forment-Aliaga from UVEG,Pascale Jegou, Albert Fert and Frédéric Petroff	ACS Nano	Volume 6 Issue 10, 04/09/2012	American Chemical Society publications	http://pubs.acs.org/	2012	8753–8757	http://pubs.acs.org/toc/ancac3/current	No
13	**Surface Nanostructures in Manganite Films**	A. Gambardella, P. Graziosi, I. Bergenti, M. Prezioso, D. Pullini, S. Milita, F. Biscarini and V. Dediu	Scientific Reports	Volume 4, Art number: 5353	Nature Publishing Group	--	2014	--	doi:10.1038/srep05353	Yes
14	**Spinterface: Crafting spintronics at the**	M. Galbiati, S. Tatay, Clément Barraud,	MRS Bulletin	Vol 39, p.602	Material Research	--	2014	--	Doi:	No

	molecular scale	Frédéric Petroff, Richard Mattana, Pierre Seneor, and Alek V. Dediu			Society				10,1557/mrs.2014.131	
15	**Tunneling anisotropic magnetoresistance in organic spin valves**	M. Grünewald, M. Wahler, F. Schumann, M. Michelfeit, C. Gould, R. Schmidt, F. Würthner, G. Schmidt, and L. W. Molenkamp	Physical Review B	Volume 84, Issue 12, 14/09/2011	American Physical Society	http://prb.aps.org/	2011	125208	DOI: http://dx.doi.org/10.1103/PhysRevB.84.125208	No
16	**A rare care of solution and solid state inter-conversion of two copper(II) dimers and a copper(II) chain**	Subrata Naiya, Saptarshi Biswas, Michael G.B. Drew, Ashutosh Ghosh, and Carlos J. Gomez-Garcia from UVEG	Inorganica Chimica Acta (The international Inorganic Chemistry Journal)	Volume 377, Issue 1, 01/11/11	Elsevier	www.elsevier.com/locate/ica	2011	Pages 26-33	DOI:10.1016/j.ica.2011.07.027	No
17	**Spin scattering and spin-polarized hybrid interface states at a metal-organic interface**	T. Methfessel, S. Steil from UNIKL, N. Baadji, N. Großmann from UNIKL, K. Koffler, S. Sanvito from QMUL, M. Aeschlimann from UNIKL, M. Cinchetti from UNIKL, and H. J. Elmers	PHYSICAL REVIEW B	Volume 84, Issue 22, 09/12/2011	American Physical Society	http://prb.aps.org/	2011	Pages: 224403-1 / 224403-7	http://link.aps.org/doi/10.1103/ PhysRevB.84.224403 DOI: 10.1103/PhysRevB.84.224403	No
18	**Assessment of density functional theory for iron(II) molecules across thespin-crossover transition**	A. Droghetti, D. Alfè, and S. Sanvito from TCD	AIP - The journal of chemical physics	Volume 137, 01/01/2012	American Institute of Physics	http://jcp.aip.org/	2012	from 124303-1 to 124303-12	http://dx.doi.org/10.1063/1.4752411	No

19	**Layered double hydroxide (LDH)–organic hybrids as precursors for low-temperature chemical synthesis of carbon nanoforms**	Gonzalo Abellán, Eugenio Coronado, Carlos Martí-Gastaldo, Antonio Riberaa and Juan F. Sánchez-Royob	Chemical Science, 23/02/2012	Volume 2012, Issue 3	Royal Society of Chemistry	--	2012	1481-1485	10.1039/C2SC01064J	No
20	**The role of interfaces in organic spin valves revealed through spectroscopic and transport measurements**	Alan J. Drew*,1, Gregory Szulczewski**,2, Laura Nuccio1, and William P. Gillin1	Phys. Status Solidi B	249	WILEY-VCH Verlag	--	2012	9–17	10.1002/pssb.201147157	No
21	**Patterning of Magnetic Bimetallic Coordination Nanoparticles of Prussian Blue Derivatives by the Langmuir–Blodgett Technique**	Miguel Clemente-LeónLangmuir	--	9 / 28, 06/03/2012	American Chemical Society	--	2012	4525 - 4533	10.1021/la2049508	Yes
22	**Tailoring magnetic properties of electrodeposited thin films of the molecule-based magnet Cr5.5(CN)12 11.5H2O**	Helena Prima-Garcia	Nanoscale Research Letters	1/7, 02/04/2012	Springer New York	--	2012	232	10.1186/1556-276X-7-232	Yes
23	**Combination of Magnetic**	Eugenio Coronado	Inorganic Chemistry	7 / 51, 02/04/2012	American Chemical	--	2012	4403 - 4410	10.1021/ic300276q	Yes

	Susceptibility and Electron Paramagnetic Resonance to Monitor the 1D to 2D Solid State Transformation in Flexible Metal–Organic Frameworks of Co(II) and Zn(II) with 1,4-Bis(triazol-1-ylmethyl)benzene				Society					
24	**Influence of the pH on the synthesis of reduced graphene oxide under hydrothermal conditions**	Bosch-Navarro C, Coronado E, Martí-Gastaldo C, Sánchez-Royo JF, Gómez MG.	Nanoscale	Volume 2012, Issue 13(4), 07/07/2012	RSC Publishing	--	2012	3977-82	10.1039/c2nr30605k	No
25	**Hybrid Magnetic Multilayers by Intercalation of Cu(II) Phthalocyanine in LDH Hosts**	Gonzalo Abellán	Journal of Physical Chemistry C	29 / 116, 17/07/2012	American Chemical Society	--	2012	15756 - 15764	10.1021/jp303537v	Yes
26	**C60-based hot-electron magnetic tunnel transistor**	**M. Gobbi, A. Bedoya-Pinto,** F. Golmar, R. Llopis, F. Casanova et al. **from NANOG**	Applied Physics Letters	Volume 101, 04/09/2012	American Institute of Physics	http://apl.aip.org/	2012	From 102404-1 to 102404-4	--	No
27	**C60/NiFe combination as a promising platform for molecular**	M. Gobbi	Organic Electronics: physics, materials,	3 / 13, 04/09/2012	Elsevier	--	2012	366 - 372	10.1016/j.orgel.2011.12.002	Yes

	spintronics		applications							
28	**Graphene electrochemical responses sense surroundings**	José G. Martínez, Toribio F. Otero, Concha Bosch-Navarro, Eugenio Coronado, Carlos Martí-Gastaldo, Helena Prima-Garcia	Electrochimica Acta	Volume 2012, Issue 81, 30/10/2012	Elsevier Limited	--	2012	49 – 57	10.1016/j.electacta.2012.03.097	yes
29	**Dynamic magnetic MOFs**	E. Coronado, G. Minguez Espallargas	Chemical Society Reviews	Volume 42, Issue 4, 12/11/2012	Royal Society of Chemistry	--	2012	1525 – 1539	10.1039/C2CS35278H	No
30	**2D bimetallic oxalate-based ferromagnets with inserted [Fe(4-Br-sal2-trien)]+ and [Fe(3-R-sal2-trien)]+ (R = Br, Cl and CH3O) FeIII Spin crossover complexes**	M. Clemente-León, E. Coronado, M. López-Jordà	European Journal of Inorganic Chemistry	Volume 2013, Issue 5-6, 19/12/2012	Wiley-VCH Verlag	--	2012	753-762	10.1002/ejic.201201113	No
31	**"Conditions for the growth of smooth La0.7Sr0.3MnO3 thin films by pulsed electron ablation",**	Patrizio Graziosi, Mirko Prezioso, Alessandro Gambardella, Catherine Kitts, Rajib Kumar Rakshit, Alberto Riminucci, Ilaria Bergenti, Francesco Borgatti, Chiara Pernechele, Massimo Solzi, Daniele Pullini, David Jeronimo Busquets-Mataix,	Thin Solid Films	28/12/2012	Elsevier	--	2012	----	--	No

		Valentin Alek Dediu								
32	**Tailoring the energy level alignment at the Co/Alq3 interface by controlled cobalt oxidation**	Haag, Norman Sabine Steil , Nicolas Großmann , Roman Fetzer , Mirko Cinchetti , Martin Aeschlimann	Applied Physics Letters	01/01/2013 United States	American Institute of Physics Inc.	--	2013	251603	10.1063/1.4850527	No
33	**2D and 3D bimetallic oxalate-based ferromagnets prepared by insertion of Mn(III)-salen type complexes.**	Clemente-León M1, Coronado E, López-Jordà M.	Dalton Trans	Vol. 42/Issue 14 01/01/2013	Royal Society of Chemistry	---	2013		10.1039/c3dt32996h	No
34	**Magnetism of TbPc2 SMMs on ferromagnetic electrodes used in organic spintronics**	L. Malavolti, L. Poggini, L. Margheriti, D. Chiappe, P. Graziosi, B. Cortigiani, V. Lanzilotto, F. Buatier de Mongeot, P. Ohresser, E. Otero, P. Sainctavit, F. Choueikani, Il. Bergenti, A. V. Dediu, M. Mannini and R. Sessoli	Chem. Commun.	49, 16/10/2013	Royal Society of Chemistry	--	2013	11506-11508	10.1039/C3CC46868B	No
35	**Hanle effect missing in a prototypical organic spintronic device**	A. Riminucci, M. Prezioso, C. Pernechele, P. Graziosi, I. Bergenti, R. Cecchini, M. Calbucci, M. Solzi, A. Dediu	Appl. Phys. Lett.	102, 08/03/2013	Applied Physics Letters	--	2013	--	http://scitation.aip.org/content/aip/journal/apl/102/9/10.1063/1.4794408	No
36	**Intercalation of Cobalt(II)-tetraphenylporphine**	G. Abellán, E. Coronado, C.J. Gómez-García, C. Martí-Gastaldo, A.	Polyhedron	Volume 2013, Issue 52,	Elsevier Limited	--	2013	216 – 221	http://dx.doi.org/10.1016/j.poly.2012.09.045	Yes

	tetrasulfonate complex in magnetic NiFe-Layered Double Hydroxide	Ribera		22/03/2013						
37	**Controllable coverage of chemically modified graphene sheets with gold nanoparticles by thermal treatment of graphite oxide with N,N-dimethylformamide**	C. Bosch-Navarro, E. Coronado, C. Marti-Gastaldo	Carbon	Volume 2013, Issue 54, 01/04/2013	Elsevier Limited	--	2013	201-207	http://dx.doi.org/10.1016/j.carbon.2012.11.027	No
38	**Stimuli Responsive Hybrid Magnets: Tuning the Photoinduced Spin-Crossover in Fe(III) Complexes Inserted into Layered Magnets**	M. Clemente-León, E. Coronado, M. López-Jordà, J. C. Waerenborgh, C. Desplanches, H. Wang, J. –F. Létard, A. Hauser, J.A. Tissot	Journal of the American Chemical Society	Volume 2013, Issue 135 (23), 15/05/2013	American Chemical Society	--	2013	8655-8667	10.1021/ja402674x	No
39	**Influence of the covalent grafting of organic radicals to graphene on its magnetoresistance**	C. Bosch-Navarro, F. Busolo, E. Coronado, Y. Duan, C. Martí-Gastaldo, H. Prima-Garcia	Journal of Materials Chemistry C	Volume 2013, Issue 30, 29/05/2013	Royal Society of Chemistry	--	2013	4590-4598	10.1039/C3TC30799A	No
40	**Magnetic Nanocomposites Formed by FeNi F. Otero Particle and**	Gonzalo Abellán , Eugenio Coronado , Carlos Martí-Gastaldo , Antonio Ribera ,Toribio	--	Volume 30, Issue 10, 01/06/2013	Wiley-VCH Verlag	--	2013	n/a-n/a	10.1002/ppsc.201300186	No

	Particle Systems Characterization									
41	**Room Temperature Magnetism in Layered Double Hydroxides due to Magnetic Nanoparticles**	G. Abellán, J.A. Carrasco, E. Coronado	Inorganic Chemistry Volume 2013, Issue 52 (14), 24/06/2013	American Chemical Society	--	--	2013	7828-7830	10.1021/ic400883k	No
42	**Large room-temperature magnetoresistance in lateral organic spin valves fabricated by in situ shadow evaporation**	M. Grünewald,J. Kleinlein, F. Syrowatka, F. Würthner, L.W. Molenkamp, G. Schmidt	Organic Electronics: physics, materials, applications	Volume 14, Issue 8, 01/08/2013	Elsevier	--	2013	2082,2086	--	No
43	**Vertical organic spin valves in perpendicular magnetic fields**	M. Grünewald, R. Gockeritz, N. Homonnay, F. Wurthner, L. W. Molenkamp, and G. Schmidt	Physical Review B	Volume 88, Issue 8 26/08/2013	American Physical Society	http://prb.aps.org/	2013	085319-	http://dx.doi.org/10.1103/PhysRevB.88.085319--	No
44	**Spin polarization in electrodeposited thin films of the molecule-based magnetic semiconductor Cr5.5(CN)12_11.5H2O**	E. Coronado, J. P. Prieto-Ruiz, H. Prima-Garcia	Chemical Communications	Volume 2013, Issue 49, 03/09/2013	Royal Society of Chemistry	--	2013	10145 – 10147	10.1039/C3CC45036H	No
45	**MOKE magnetometry as a probe of surface**	E. Coronado, M. Fitta, J. P. Prieto-Ruiz, H. Prima-García, F.M. Romero, A.	Journal of Materials Chemistry	Volume 2013, Issue 42,	Royal Society of Chemistry	--	2013	6981-6988	10.1039/C3TC31316F	No

	magnetic impurities in electropolymerized magnetic thin films of the Prussian blue analogue Fe3[Cr(CN)6]2•15 H2O	Cros	C	05/09/2013						
46	**Interplay between Chemical Composition and Cation Ordering in the Magnetism of Ni/Fe Layered Double Hydroxides**	G. Abellán, E. Coronado, C. Martí-Gastaldo, J. Waerenborgh, A. Ribera	Chemical Society Reviews	Volume 2013, Issue 52 (17), 20/09/2013	Royal Society of Chemistry	--	2013	10147–10157	10.1021/ic401576q	No
47	**Spin-Crossover Modification through Selective CO**	Eugenio Coronado , Mónica Giménez-Marqués , Guillermo Mínguez Espallargas , Fernando Rey , Iñigo J. Vitórica-Yrezábal	Journal of the American Chemical Society	Vol. 135/Issue 43, 30/10/2013	American Chemical Society United States	--	2013	15986-15989	10.1021/ja407135k	
48	**Insertion of FeII complexes with Schiff base ligands derived from imidazole or pyridine into 3D bimetallic oxalate-based ferromagnets**	A. Ben Djamâa, M. Clemente-León, E. Coronado, M. López-Jordà Polyhedron	--	Volume 2013, Issue 64, 12/11/2013	Elsevier Limited	--	2013	142 – 150	http://dx.doi.org/10.1016/j.poly.2013.03.015	No
49	**Spin-dependent electronic structure of the Co/Al(OP)3**	Sabine M¨ uller, Sabine Steil, Andrea Droghetti, Nicolas Großmann,	New Journal of Physics	Volume 2013, Issue 15,	Institute of Physics Publishing	--	2013	113054 - 113066	10.1088/1367-2630/15/11/113054	No

	interface	Velimir Meded, Andrea Magri,Bernhard Sch¨ afer3, Olaf Fuhr3, Stefano Sanvito, Mario Ruben, Mirko Cinchetti,and Martin Aeschlimann		26/11/2013						
50	**The importance of holes in aluminium tris-8-hydroxyquinoline (Alq3) devices with Fe and NiFe contacts**	Hongtao Zhang, P. Desai, Y. Q. Zhan, A. J. Drew, W. P. Gillin, and T. Kreouzis	--	Applied Physics Letters104, 013303 (2014), 06/01/2014	American Institute of Physics Inc.	--	2014	013303-1, 013303-4	--	No
51	**Insertion of a Single-Molecule Magnet inside a Ferromagnetic Lattice Based on a 3D Bimetallic Oxalate Network: Towards Molecular Analogues of Permanent Magnets**	M. Clemente-León, E. Coronado, C.J. Gómez-García, M. López- Jordà, A. Camón, A. Repollós, F. Luis	American Journal of Biochemistry and Biotechnology	Volume 20, Issue 6, 21/01/2014	Science Publications	--	2014	1669-76	10.1002/chem.201304907	No
52	**A chemical and electrochemical multivalent memory made from FeNi3-graphene nanocomposites**	G. Abellán, J.G. Martínez, T.F. Otero, A. Ribera, E. Coronado	Electrochemistry Communications	Volume 39, 01/02/2014	Elsevier Inc.	--	2014	15–18	10.1016/j.elecom.2013.11.026	No
53	**Electronic and magnetic properties of the interface**	Andrea Droghetti , Sabine Steil , Nicolas Großmann , Norman	Physical Review B - Condensed	Vol. 89/Issue 9, 01/03/2014	American Physical Society	--	2014	---	10.1103/PhysRevB.89.094412	--

	between metal-quinoline molecules and cobalt	Haag , Hongtao Zhang , Maureen Willis , William P. Gillin , Alan J. Drew, Martin Aeschlimann , Stefano Sanvito , Mirko Cinchetti	Matter and Materials Physics							
54	**Hybrid Interface States and Spin Polarization at Ferromagnetic Metal-Organic Heterojunctions: Interface Engineering for Efficient Spin Injection in Organic Spintronics**	Shengwei Shi, Zhengyi Sun, Amilcar Bedoya, Patrizio Graziosi, Xin Li, Xianjie Liu, Luis Hueso, Valentin A. Dediu, Yi Luo, Mats Fahlman	Advanced Functional Materials	In press Accepted Submitted 21/03/2014	Wiley-VCH Verlag	--	2014	--	10.1002/adfm.201400125	No
55	**Spin-crossover complex based on 2,6-bis(pyrazol-1-yl)pyridine (1-bpp) ligand functionalized with a carboxylate group**	A. Abhervé, M. Clemente-León, E. Coronado, C.J. Gómez-García, M. López-Jordà	Dalton Transactions	Volume 43		--	2014	9406 – 9409		
56	**A Combined Ion Scattering, Photoemission, and DFT Investigation on the Termination Layer of a La0.7Sr0.3MnO3 Spin Injecting**	L. Poggini, S. Ninova, P. Graziosi, M. Mannini, V. Lanzilotto, B. Cortigiani, L. Malavolti, F. Borgatti, U. Bardi, F. Totti, I. Bergenti, V. A. Dediu, and R. Sessoli	J. Phys. Chem. C	On-line pubblication date: 29/05/2014	American Chemical Society	--	2014	--	DOI: 10.1021/jp5026619	No

	Electrode									
57	**A Mixed-Ligand Approach for Spin-Crossover Modulation in a Linear Fe(II) Coordination Polymer**	N. Calvo Galve; E. Coronado; M. Gimenez-Marques; G. Minguez Espallargas	Inorganic Chemistry	Volume 53, 05/05/2014			2014	4482 – 4490		No
58	**Energy level alignment and interactive spin polarization at organic/ferromagnetic metal interfaces for organic spintronics**	Zhengyi Suna, Yiqiang Zhan, Shengwei Shi, Mats Fahlman	Organic Electronics	In press	Elsevier	--	2014	--	10.1016/j.orgel.2014.05.021	No

Table A2- *List of all dissemination activities*

TABLE A2: LIST OF DISSEMINATION ACTIVITIES						
EVENT	**PLACE**	**DATES**	**WEBSITE**	**DISSEMINATION ACTIONS**	**PARTNER**	**PARTICIPANTS**
Jornadas Hispanofrancesas de Química Orgánica	Burgos (Spain)	19th - 24th June 2011	http://www3.ubu.es/16jhisfraqo/pagina.php?p=presentacion	Talk: "Molecular Nanoscience: a source of new chemistry, new physics and new materials"	UVEG	E. Coronado
XXIII Bienal RSEQ 2011	Valencia (Spain)	25th – 28th July 2011	----	Talk: "Chemistry and Magnetism: Towards Molecular Spintronics"	UVEG	E. Coronado
IUCR2011 XXII International Congress	Madrid (Spain)	22nd – 30th August 2011	www.iucr2011madrid.es	Talk: "Molecular Design of Multifunctional magnetic materials"	UVEG	E. Coronado
11th European Conference on Molecular Electronics ECME 2011	Barcelona (Spain)	06th – 10th September 2011	http://www.ecme2011.com/	Poster: "Spin-resolved photoemission study of the interface of transition metal phthalocanines on Co(001)"	UNIKL	A.Altenhof
11th European Conference on Molecular Electronics ECME 2011	Barcelona (Spain)	06th – 10th September 2011	http://www.ecme2011.com/	Talk: "Chemisorpion induced hybrid interfaces states as a concept to overcome the conductance mismatch"	UNIKL	A.Altenhof
ACIN: International Symosium on Advanced Complex Inorganic Nanomaterial	Narum (Belgium)	11th – 14th November 2011	http://webapps.fundp.ac.be/acin2013/	Talk: "Inorganic Nanomaterials for Molecular Spintronics"	UVEG	E. Coronado
KOSMOS Summer University 2011 Frontiers of	Berlin (Germany)	17th – 25th September 2011	https://www.hu-berlin.de/kosmos/kosmos2011	Poster: "Spin-resolved photoemission study of the interface of transition metal phthalocanines on Co(001)"	UNIKL	A.Altenhof

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EVENT	**PLACE**	**DATES**	**WEBSITE**	**DISSEMINATION ACTIONS**	**PARTNER**	**PARTICIPANTS**
Organic/Inorganic Hybrid materials for Eectronics and Optoelectronics						
ISCOM 2011 International Congress on Membranes and Membrane Processes	Gniezno (Poland)	25th – 30th September 2011	http://www.icom2011.org/	Talk:" Hybrid Magnetic Superconductors by Chemical Design"	UVEG	E. Coronado
3rd ACCC: 3rd Asian Conference on Coordination Chemistry	New Delhi (India)	17th – 20th October 2011	http://conferenceindia.org/accc3/welcome.html	Talk: "The role of Coordination Chemistry in Molecular Spintronics"	UVEG	E. Coronado
NANOCON 012: 2nd International Conference on Nanotechnology	Pune (India)	18th -19th October 2011	----	Talk: "Chemistry in Molecular Spintronics"	UVEG	E. Coronado
Physics at the nanoscale"Symposium celebration Prof. Ivan Schuller 65th birthday"	Madrid (Spain)	18th – 21st October 2011	----	Talk: "Molecular Spintronics"	UVEG	E. Coronado
4th European School on Molecular Nanoscience	Peñiscola (Spain)	23rd – 28th October 2011	http://www.icmol.es/esmolna2009/1circular.php?var=1circular	School: "Organization of the 4th European School on Molecular Nanoscience" Talk: "Introduction to Molecular Nanoscience"	UVEG	E. Coronado
ECMM: Third European Conference on Molecular Magnetism	Paris (France)	22nd – 25th November 2011	http://ecmm.stud.wchuwr.pl/home.html	Talk: "Coexistence of ferromagnetism and photoinduced spin crossover in a family of oxalate-based compounds with inserted Fe(II) and De(III) complexes" Talk: "Structural and Functional Transformations in Magnetic MOFs"	UVEG	M. Clemente-León, E. Coronado, M. López-Jordà, C. Desplanches, S. Asthana, H. Wang, J.F. Létard, G. Minguez Espallargas, M. Giménez-

TABLE A2: LIST OF DISSEMINATION ACTIVITIES						
EVENT	**PLACE**	**DATES**	**WEBSITE**	**DISSEMINATION ACTIONS**	**PARTNER**	**PARTICIPANTS**
						Marqués, E. Coronado
From molecule to switchable materials: Photo, thermo and electro-switching	Brest (France)	27th -29th November 2011	http://www.univ-brest.fr/switchmat2011/home	Talk: "Switchable Magnetic Materials: From Multifunctional Materials to Single-Molecules"	UVEG	E. Coronado
Advance quality control	Paris (France)	1st December 2011	/	Workshop organization	LiU	Mats Fahlman
2nd International Symposium on Creation of Functional Materials	Tsukuba – Tokyo (Japan)	7th – 11th February 2012	http://www.chem.tsukuba.ac.jp/ccfm/en/index.html	Talk: "Magnetic Molecules and Hybrid Materials for Molecular Spintronics"	UVEG	E. Coronado
Summer School: Physics and Chemistry of Spintronics Materials	Orange County Resort (Karnaka, India)	22th – 26th February 2012	http://www.mainz.uni-mainz.de/1087.php	Talk: "Metal-organic hybrid interface states of a ferromagnetic/organic semiconductor hybrid junction as basis for engineering spin injection in organic spintronics"	UNIKL	Altenhof
Third European Workshop on Self Organized Nanomagnet	Madrid (Spain)	16th – 20th April 2012	www.nanomagnets2012.es/	Talk: "Accurate organization of nanoparticles based on magnetic coordination compounds"	UVEG	E. Coronado, A. Forment-Aliaga, E. Pinilla-Cienfuegos, S. Tatay, L. Catala, J. A. Plaza
Intermag 2012 IEEE International magnetic conference	Vancouver (Canada)	7th – 11st May 2012	Http://intermagconference.com/2012/	Talk: "Engineering interface via the inclusion of thin polar/insulating layers"	QMUL	A. Drew
Intermag 2012 IEEE International magnetic conference	Vancouver (Canada)	7th – 11st May 2012	Http://intermagconference.com/2012/	Talk: "BC-90 moleculkar spintronics using self-assembled monolayers"	THALES	M.Galbiati
Intermag 2012	Vancouver	7th – 11st	Http://intermagconference.com/	Talk: "Magnetically enhanced (modulated)	ISMN-CNR	A. Dediu

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IEEE International magnetic conference	(Canada)	May 2012	2012/	memristor (MEM)		
Intermag 2012 **IEEE International magnetic conference**	Vancouver (Canada)	7th – 11st May 2012	Http://intermagconference.com/2012/	General Project dissemination		L. Hueso M. Cinchetti
Third European Workshop on Self Organized Nanomagnets	Madrid (Spain)	4th April 2012	---	Talk "Accurate organization of nanoparticles based on magnetic coordination compounds"	UVEG	E. Coronado, A. Forment-Aliaga, E. Pinilla-Cienfuegos, S. Tatay, L. Catala, J. A. Plaza
---	China	May 2012	---	Seminar tour in various Chinese universities presenting some of the research undertaken by HINTS	QMUL	A. Drew
"PDSTM Phase transition and Dynamical Properties of Spin Transition Materials"	Meudon (France)	22nd – 25th May 2012	---	Talk: "Spin Switching in Molecules, Nanoparticles and Crystals"	UVEG	C. Bosch-Serrano, M. Clemente-León, M. Giménez-Marqués, M. López-Jordà, G. Minguez-Espallargas
15 International workshop on computational electronics	Madison, USA	22nd – 25th May 2012	http://iwce2012.engr.wisc.edu/	"Computational Spintronics" – Invited Talk	TCD	A. Droghetti
Solution Processed materials	Valencia (Spain)	1st June 2012		Workshop organisation	UVEG	E. Coronado
Simposio Internacional: La Química de nuestro tiempo	Madrid (Spain)	7th – 8th June 2012	http://www.fundacionareces.es/fundacionareces/cargarAplicacionAgendaEventos.do?identificador=1410	Talk: "Química y Spintrónica: el papel de las moléculas"	UVEG	E. Coronado
Visit in Kaiserslautern, Invited talk: "Electric control and readout of	Kaiserslautern (Germany)	11st -16th June 2012		Invited talk: "Electric control and readout of the magnetic moment of Fe(II) ad Co dioxolene molecules.	TCD	A. Droghetti

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the magnetic moment of Fe(II) ad Co dioxolene molecules.						
Frontiers in electronics materials correlation effects and memristive phenomena.	Eurogress Aachen, Aachen, Germany	17th – 20th June 2012	Http://www.nature.com/naturecconferences/fem2012/index.html	Invited kickoff talk: "magnetically enhanced memristor" Poster: "magnetically enhanced memristor"	CNR-ISMN	M. Prezioso
Workshop: What about U? - Corrective approaches to DFT for strongly-correlated systems CECAM-HQ-EPFL	Lausanne, Switzerland	June 18, 2012 to June 21, 2012	http://www.cecam.org/workshop-0-637.html	Organization of workshop	TCD	A. Droghetti
SPSSM Symposium: 4th International Symposium on Structure-Property Relationships in Solid State Materials	Bordeaux (France)	24th – 29th June 2012	http://sig5.ecanews.org/news-and-activity/activity/247-spssm-2012	Talk: "Multifunctional Magnetic Materials"	UVEG	E. Coronado
Future directions of molecules electrons	Leiden (Holland) Lorentz Center International Center for workshops in the Sciences	25th-29th June 2012	Http://www.lorentzcenter.nl/lc/web/2012/489/info.php3?Wsid=489&venue=Oort	Presentation and overview lecture on molecular spintronics	TCD	S. Sanvito
International Conference on Molecular Materials	Barcelona (Spain)	3rd – 6th July 2012	http://www.unizar.es/eimm2/index.php?option=com_content&view=article&id=598:vth-	Talk: "Chemistry in molecular spintronics"	UVEG	E. Coronado

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			international-conference-on-molecular-materials&catid=50:actualevents&Itemid=69			
Conference: Quantum Monte Carlo in the Apuan Alps VIII	Vallico Sotto, Tuscany, Italy	28th of July to 4th of August 2012	http://www.vallico.net/tti/master.html?http://www.vallico.net/tti/qmcitaa_12/	Talk: "First principles studies of spin-crossover molecules"	TCD	A. Droghetti
"ICM2012: The 19th International Conference on Magnetism"	Busan (Korea)	8th – 13th July 2012	http://www.icm2012.org/	Talk: "Quantum effects in Molecular Single-Ion Magnets"	UVEG	E. Coronado
PASPS 2012 The 7th International Conference on Physics and Applications of Spin-related Phenomena in Semiconductors	Eindhoven University of Technology, (The Netherlands)	5th - 8th August 2012	www.phys.tue.nl/PASPS/	Poster: Phthalocyanines based spin valves operating at large bias voltages	MLU	G. Schmidt
IX simposio de investigadores químicos RSEQ-Sigma Aldric	Zaragoza (Spain)	7th September 2012	http://ixsij.unizar.es/	Talk: "Organización y Caracterización de nanopartículas magnéticas en superficies"	UVEG	A.Forment-Aliaga, E. Pinilla-Cienfuegos, S. Kumar, E. Navarro, E.Coronado,S. Tatay, L. Catala
JEMS 2012 Joint European Magnetic Symposia	Parma – Italy	9th -14th September 2012	Http://www.jems2012.it/	Contributed talk Session Chair	UNIKL ISMN	S. Steil A. Dediu
JEMS 2012	Parma – Italy	9th -14th September 2012	Http://www.jems2012.it/	Talk: "Large tunnel magnetoresistance effect in self-assembled monolayers based magnetic tunnel junctions"	THALES	M. Galbiati

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Joint European Magnetic Symposia						
JEMS 2012 **Joint European Magnetic Symposia**	Parma – Italy	9th -14th September 2012	Http://www.jems2012.it/	Talk: "Molecular spintronic: properties beyond inorganics"	CNRS	R. Mattana
ICCC40 **40 International conference on coordination chemistry**	Valencia (Spain)	9th – 13th September 2012	Http://iccc40.com/	Presentation of hints project + Poster "Accurate deposition of nanopartices based on magnetic coordination chemistry compounds" + Poster "Electron Transport Through a Bistable Copper Rotaxane" + Poster "Electrostatic grafting of Mn4 Single molecule magnets onto Chemically-modified carbon nanotubes" + Poster "Mixed-Valence Polyoxometalates: Use of Symmetry in the Dynamic Vibronic Problem"	UVEG	E.Coronado A. Forment-Aliaga, S. Tatay
ICCC40 **40 International conference on coordination chemistry**	Valencia (Spain)	9th – 13th September 2012	Http://iccc40.com/	Poster:"single-Ion magnets based on lanthanoid polyoxometalate complexes soluble in organic solvents"	MEBK	Jens Schutte
JEMS 2012 **Joint European Magnetic Symposia**	Parma – Italy	9th -14th September 2012	Http://www.jems2012.it/	Talk: "Assessment of density functional theory for iron (II) molecules across the spin-crossover transition	TCD	A. Droghetti
Spinos 2012 **4th International Meeting on Spins in Organic Semiconductors**	Queen Mary, University of London London (UK)	10th – 13th September 2012	Http://spinos.ph.qmul.ac.uk/	Presentation of the results of hints project Poster presentaitons	QMUL UNIKL MLU MBEK TCD NANOG	A. Drew, M. Cinchetti N. Grossman, S. steil C. Ziegler, S. Lach J.Schutte, G. Schmidt M. Gruenewald R. Goeckeritz, A. Dediu

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					ISMN	L. Hueso, A. Bedoya M. Prezioso M. Aeschlimann
Workshop 'Información Cuántica en España"	Madrid (Spain)	17th September 2012	__	Talk: "Rational design of Single Ion Magnets" Talk: "Shor's quantum error correction using a single molecule"	UVEG	José J. Baldoví A. Gaita-Ariño
25 years of muon spin spectroscopy	Abingdon, UK	17th-18th September 2012	---	Spintronics with small molecules (invited talk)	QMUL	A Drew
Functional Molecules on Surfaces: New Building Blocks for Nano-Spintronics CECAM/Psi-k Workshop 2012	Gustav-Stresemann-Institut Bonn (Germany)	2nd - 4th October 2012	Http://www.fz-juelich.de/pgi/EN/Leistungen/conferencesandworkshops/funmol/Program/_node.html		TCD	S. Sanvito
Workshop Functional Molecules on Surfaces: New Building Blocks for Nano-spintronics	Bonn (Germany)	2nd - 4th October 2012	Http://www.cecam.org/workshop-641.html	Presentation of the results of hints project	TCD	S. Sanvito
ICMM2012: The 13th International Conference on Molecule-based Magnets	Florida (US)	7th – 11th October 2012	http://icmm2012.cos.ucf.edu/?p=21	Talk: "Chemistry in Molecular Spintronics" Talk: "Rational design of Single Ion Magnets"	UVEG	E. Coronado José J. Baldoví
Scientific workshop	Bled Lake (Slovenia)	11st – 12nd October 2012	--	---	ISMN-CNR, NANOG, TCD, MLU, IN, UNIKL	Alek Dediu (ISMN-CNR) Vicktor Kabanov (JSI) Luis Hueso (NANOG) Stefano Sanvito (TCD) Georg Schmidt (MLU), Roberta Modolo (IN), Mirko Cinchetti (UNIKL)

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QUIMICUBA2012: Simposio: Nuevos Conceptos en Química Molecular, Macro-Molecular y Supramolecula	La Habana (Cuba)	9th -12th October 2012	www.chemistrycuba.com/	Talk: "Chemistry in Molecular Spintronics"	UVEG	E. Coronado
NANOCON 012: 2nd International Conference on Nanotechnology	Pune (India)	18th – 19th October 2012	www.nanocon2012.com/	Talk: "Chemistry in Molecular Spintronics"	UVEG	E. Coronado
5th simposio: Global Center of Excellence for Atomically Controlled Fabrication Technology	Japan Osaka University Nakanoshima Center, Osaka, (Japan)	22nd - 24th October 2012	Http://www.prec.eng.osaka-u.ac.jp/gcoe/symposium/2012/welcome.html	Talk: "Opportunities in Molecular Electronics with the Spin Degree of Freedom"	TCD	S. Sanvito
5th European School on Molecular Nanoscience ESMOLNA 2012	Cuenca (Spain)	28th October – 2nd November 2012	http://www.icmol.es/esmolna2012/	School: "Organization of the 5th European School on Molecular Nanoscience" Talk: "Introduction to Molecular Nanoscience"	UVEG NANOG	Eugenio Coronado Luis Hueso
Nanolito 2012, the fifth Spanish workshop on Nanolithography	San Sebastian (Spain)	13th – 15th November 2012	www.nanogune.eu/en/nanolito2012	Poster: "From hybrid multifunctional materials towards monolayer system"	UVEG NANOG	E. Coronado L. Hueso A. Bedoya
Frontiers on Metal Oxide Cluster Science	Lanzarote (Spain)	18th – 21st November 2012	ww.icmol.es/fmocs2012	Talk: "Modelling the properties of lanthanoid SIMs based on polyoxometalates" Talk: "Polyoxometalates as spin qubits" Talk:" Polyoxometalates in Molecular Magnetism"	UVEG	José J. Baldoví, A. Gaita-Ariño, J.M. Clemente-Juan
Symposium on "Frontiers in Metal-Oxide cluster Science-II) FMCOS-II	Lanzarote (Canary Islands- Spain)	18th - 22nd November 2012	www.icmol.es/fmocs2012	School: "Organization of the symposium Frontiers in Metal-Oxide Cluster Science 2012"	UVEG	Eugenio Coronado
	Venice	21ST -23RD	www.nanotechitaly.it	INVITED TALK	ISMN	Alek Dediu

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Nanotechitaly 2012	Italy	November 2012			IN	
MAM 12 6th international symposium on macro and supramolecular architectures and materials Special theme: nano systems and applications	Coimbatore India	21st -25th November 2012.	Http://www.mam12.ksrct.ac.in/	Invited talk on hybrid interfaces in spintronics	UNIKL	Christiane Ziegler
GRANADA'12 Graphene ... from Dirac Physics to Applications	Granada (Spain)	30th November 2012	http://ergodic.ugr.es/granada12/	Talk: "From hybrid multifunctional materials towards monolayer system"	UVEG	Eugenio Coronado, A.Forment-Aliaga
12th Joint MMM/Intermag Conference	Chicago (US)	14-18 January 2013	Www.magnetism.org	PRESENTATION OF THE RESULTS OF HINTS PROJECT	NANOG	Amilcar Bedoya
DPG Spring meeting,	Regensburg	5th-10th March 2013	---	Topical talk	UNIKL	M. Cinchetti
"Chemical Nanoscience Symposium, 2013"	New Castle (UK)	March 13th 2013	---	Invited lecture: "Molecular Spintronics: The role of chemistry"	UVEG	E. Coronado
APS March Meeting	Baltimore, USA	18th – 22nd March 2013	www.aps.org	Spinterfaces – results from HINTS (invited talk)	QMUL	A Drew
Workshop "Colloque Louis Néel"	Tours (France)	19th – 22nd March 2013	---	Poster "Growth of Self-Assembled Monolayers directly on a ferromagnetic metal surface"	CNRS	Richard Mattana

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HINTS WORKSHOP	Kaiserslautern, Germany	29th April 2013	---	Mirko Cinchetti (UNIKL) - Alek Dediu (ISMN-CNR) Organisation	ALL Consortium	All Consortium
Hints workshop	Kaiserslautern, Germany	29th April 2013	---	Talk Title: "Theoretical input on magnetic molecules"	TCD	Andrea Droghetti
Workshop "Statistical Physics and Low Dimensional Systems"	Pont-à-Mousson (France)	15^{th} – 17^{th} May 2013	http://www.lpm.u-nancy.fr/activite_physique_statistique/SPLDS/	Invited Talk "Spintronics With Small Molecules"	CNRS	Richard Mattana
"PoCHEMoN2013 1st European Conference on Polyoxometalate Chemistry for Molecular Nanoscience"	Tenerife (Spain)	16^{th} – 19^{th} May 2013	---	Invited lecture: "Nanomagnetism and Molecular Spintronics"	UVEG	E. Coronado
"EINC2013: Easter Island Nanoscience Conference"	Rapa Nui, Easter Island (CHILE)	4^{th} – 8^{th} June 2013	---	Invited lecture: "Molecular Spintronics""	UVEG	E. Coronado
"10th International Symposium on Crystalline Organic Metals, Superconductors and Magnets. (ISCOM)	Montreal (CANADA)	14^{th} – 19^{th} July 2013	---	Invited lecture: "A new series of chiral porous molecular layered magnets with tunable Tc""	UVEG	Carlos J. Gómez-García; Samia Benmansour; Matteo Atzori; Miguel Clemente-León; Guillermo Minguez-Espallargas; Alexandre

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2013"						Abhervé; Patricia Gómez-Claramunt; Maria Laura Mercuri
Conference "Quantum Monte Carlo in the Apuan Alps"	Vallico di Sotto, Lucca, Tuscany (Italy)	(27 July-3 August 2013)	http://www.vallico.net/tti/master.html?http://www.vallico.net/tti/qmcitaa_13/	Talk ""A DFT+model Hamiltonian approach to zero-bias transport in nanostructures: work in progress"	TCD	A. Droghetti
Spintech VII	Chicago, USA	29TH -2nd August 2013	http://spintech7.cnsi.ucsb.edu/	Invited lecture: Vertical organic spin valves in perpendicular magnetic fields	MLU	Georg Schmidt
The Como moments	Como, Italy	24th – 30th August 2013	http://www.complexcomolake.it/thecomomoments/	Talk: "A DFT+ model Hamiltonian approach to zero-bias transport in nano structures: work in progress"	TCD	A. Droghetti
The Como moments	Como, Italy	24th – 30th August 2013	http://www.complexcomolake.it/thecomomoments/	Title: "Quantitative electron transport from density functional theory"	TCD	S. Sanvito
"SolGel2013 XVIII International Sol-Gel Conference"	Madrid (Spain)	25th – 30th August 2013		"Design of hybrid Materials for Molecular Spintronics""	UVEG	E. Coronado
Joint European Symposia on Magnetism (JEMS 2013)	Rhodes (Greece)	25th – 30th August 2013	http://www.jems2013.org/	Oral Communication "Impact Of Interface Hybridization On Spin Injection In Molecules"	CNRS	Richard Mattana
Current research in magnetism	London (UK)	September 2013	---	Spintronics with small molecules (contributed talk)	QMUL	H Zhang A Drew
"TNT 2013" 14th Edition of Trends in	Sevilla (Spain)	09th - 13th September	http://www.tntconf.org/2013/index.php?conf=13	Self Assembled Monolayers over Ferromagnetic Surfaces	UVEG	M.Mattera, A. Forment-Aliaga, S. Tatay, E.

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Nanotechnology International Conference		2013		Poster		Coronado
"TNT 2013" 14th Edition of Trends in Nanotechnology International Conference	Sevilla (Spain)	09th - 13th September 2013	http://www.tntconf.org/2013/index.php?conf=13	Growth of Self-Assembled Monolayers directly on a ferromagnetic metal surface	UVEG	A. Forment-Aliaga; S. Tatay; M. Mattera1; M. Galbiati; P. Seneor; R. Mattana; E. Coronado.
"Frontiers in Molecular Magnetism in China"	Nanjing (CHINA)	15th – 19th September 2013	---	Talk: "Hybrid Materials for Molecular Spintronics""	UVEG	E. Coronado
E-MRS 2013 Fall Meeting; Symposium H: Organic and Carbon based Spintronics: materials and device trends	Warsaw University of Technology (Poland)	16th – 20th September 2013	---	Invited talk "Organic and carbon based spintronics: materials and device trends"	UNIKL	M. Cinchetti
E-MRS 2013 FALL MEETING	Warsaw (Poland)	16th – 20th September 2013	http://www.emrs-strasbourg.com/index.php?option=com_content&task=view&id=572&Itemid=1584	Talk "Direct Observation of Spin Polarization at Organic/Ferromagnetic Interfaces"	LiU	Shengwei Shi
E-MRS 2013 FALL MEETING	Warsaw (Poland)	16th – 20th September 2013	http://www.emrs-strasbourg.com/index.php?option=com_content&task=view&id=572&Itemid=1584	Talk "Magnetic interactions in molecule-metal bilayers triggered by interfacial chemistry"	NanoGUNE UV LiU UK TCD	Shengwei Shi
E-MRS 2013 FALL MEETING	Warsaw (Poland)	16th – 20th September	http://www.emrs-strasbourg.com/index.php?optio	Poster "Role of thick LiF layer in energy level	LiU	Zhengyi Sun

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		2013	n=com_content&task=view&id=572&Itemid=1584	alignment of metal-organic interface"		
Abschlussworkshop DFG SPP 1285 "Semiconductor Spintronics"	Würzburg, (Germany)	17th – 18th October 2013	---	Invited talk	UNIKL	M. Aeschlimann
"ESMOLNA 2013 "6th European School on Molecular Nanoscience"	Cuenca (Spain)	27th – 31st October 2013	http://www.icmol.es/esmolna2013/	Talk : "Introduction to Molecular Nanoscience"	UVEG	E. Coronado
"EsMolNa 2013" 6th Edition of European School on Molecular Nanoscience	Cuenca (Spain)	27th – 31st October 2013	http://www.icmol.es/esmolna2013/	Talk : "Self-Assembled Monolayers over Ferromagnetic Surfaces – Oral"	UVEG	M.Mattera, A. Forment-Aliaga, S. Tatay, E. Coronado
2D Materials 2013 **Workshop on 2D Materials**	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	SPECIALIZED LECTURES (ICMol-Universitat de València, Spain): *Atomically thin superconductors.*	UVEG	Coronado Miralles, Eugenio
2D Materials 2013 **Workshop on 2D Materials**	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	SPECIALIZED LECTURES (ICMol-Universitat de València, Spain): *Multifunctionality by chemical design of 2D hybrid materials.*	UVEG	Navarro-Moratalla, Efrén
2D Materials 2013 **Workshop on 2D Materials**	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	SPECIALIZED LECTURES (ICMol-Universitat de València, Spain): *Local Oxidation Nanolithography on 2D Materials.*	UVEG	Pinilla Cienfuegos, Elena
ESMolNa 2013 **VI European School on**	Cuenca, (Spain)	31st October – 1st	http://www.icmol.es/esmolna201	SPECIALIZED LECTURES (ICMol-Universitat de València, Spain):	UVEG	Coronado Miralles, Eugenio

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Molecular Nanoscience		November 2013	3/	*Atomically thin superconductors.*		
ESMolNa 2013 VI European School on Molecular Nanoscience	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	SPECIALIZED LECTURES (ICMol-Universitat de València, Spain): *Coherent manipulation of molecular spin qubits: the case of GdW30.*	UVEG	Gaita Ariño, Alejandro
ESMolNa 2013 VI European School on Molecular Nanoscience	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	SPECIALIZED LECTURES (ICMol-Universitat de València, Spain): *Stimuli responsive magnetic MOFs.*	UVEG	Mínguez Espallargas, Guillermo
ESMolNa 2013 VI European School on Molecular Nanoscience	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	SPECIALIZED LECTURES (ICMol-Universitat de València, Spain): *Magnetic superconductors by chemical design of hybrid 2-D materials.*	UVEG	Navarro-Moratalla, Efrén
ESMolNa 2013 VI European School on Molecular Nanoscience	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	SPECIALIZED LECTURES (ICMol-Universitat de València, Spain): *Local Oxidation Nanolithography on 2D Materials.*	UVEG	Pinilla Cienfuegos, Elena
ESMolNa 2013 VI European School on Molecular Nanoscience	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	ORAL COMMUNICATIONS, (ICMol-Universitat de València, Spain): *Reversible Photo-switching of Magnetic Properties in Hybrid Layered Double Hydroxides.*	UVEG	Abellán Sáez, Gonzalo
ESMolNa 2013 VI European School on Molecular Nanoscience	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	ORAL COMMUNICATIONS. (ICMol-Universitat de València, Spain): *Modeling the properties of lanthanoid Single-Ion Magnets.*	UVEG	Baldoví, José J

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ESMolNa 2013 **VI European School on Molecular Nanoscience**	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	ORAL COMMUNICATIONS (ICMol-Universitat de València, Spain): *Ultrathin Films of NiFe-LDHs: Towards a Hierarchical Synthesis of CNF.*	UVEG	Carrasco Andrés, José Alberto
ESMolNa 2013 **VI European School on Molecular Nanoscience**	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	ORAL COMMUNICATIONS (ICMol-Universitat de València, Spain): *Anilate-based molecular bricks: from 0D to 1D, 2D and 3D coordination polymers with long range magnetic ordering, porosity, chirality and control of Tc*	UVEG	Gomez Claramunt, Patricia
ESMolNa 2013 **VI European School on Molecular Nanoscience**	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	ORAL COMMUNICATIONS (ICMol-Universitat de València, Spain): *Self Assembled Monolayers over Ferromagnetic surfaces.*	UVEG	Mattera, Michele
ESMolNa 2013 **VI European School on Molecular Nanoscience**	Cuenca, (Spain)	31st October – 1st November 2013	http://www.icmol.es/esmolna2013/	ORAL COMMUNICATIONS**,** (ICMol-Universitat de València, Spain): *Preparation of ultrathin films of Metal-Organic Frameworks on ferromagnetic substrates.*	UVEG	Víctor Rubio Giménez
Carbon-based Nano-materials and Devices	Promised Land Resort & Lagoon, Hualien, Taiwan	3rd-8th November 2013	http://www.engconf.org/conferences/materials-science-including-nanotechnology/carbon-based-nano-materials-and-devices/#header9	Invited talk Title: "The manipulation of spins in organic materials"	TCD	Stefano Sanvito
"ACCC4 "4th Asian	Jeju (COREA)	4th – 8th	---	Talk**: "**Quantum effects in Molecular Single-Ion	UVEG	E. Coronado

TABLE A2: LIST OF DISSEMINATION ACTIVITIES						
EVENT	**PLACE**	**DATES**	**WEBSITE**	**DISSEMINATION ACTIONS**	**PARTNER**	**PARTICIPANTS**
Conference on Coordination Chemistry"		November 2013		Magnets"		
58th Magnetism and Magnetic Materials Conference (MMM Conference); Symposium on "Spin injection and transport in organic materials"	Denver, Colorado	4th – 8th November 2013	---	Invited talk: "Spin injection and transport in organic materials"	UNIKL	M. Cinchetti
ACSIN-12, 12th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures	Tsukuba, Japan	4th – 8th November 2013	http://dora.bk.tsukuba.ac.jp/event/acsin12/	Invited talk	UNIKL	M. Aeschlimann
"XSIJ 2013" Decimo Simposio de Investigadores Jovenes de la Real Sociedad Española de Quimica SIGMA-ALDRICH	Madrid, Spain	06th - 09th November 2013	---	Monocapas Auto-ensambladas sobre superficies ferromagnéticas Poster	UVEG	M.Mattera, A. Forment-Aliaga, S. Tatay, E. Coronado
European Workshop in molecular spintronics	Tenerife, Spain	21st – 24th November 2013	http://www.icmol.es/elfos-hints2013/		All the consortium	

TABLE A2: LIST OF DISSEMINATION ACTIVITIES						
EVENT	**PLACE**	**DATES**	**WEBSITE**	**DISSEMINATION ACTIONS**	**PARTNER**	**PARTICIPANTS**
Elfos-Hints 2013 **European Workshop in Molecular Spintronics**	Tenerife, Spain	21st – 24th November 2013	http://www.icmol.es/elfos-hints2013/	Oral communication (ICMol, Universitat de València) : Molecular anisotropy determination in molecular nanomagnets from an effective electrostatic model	UVEG	Baldoví, José J.
Elfos-Hints 2013 European Workshop in Molecular Spintronics	Tenerife, Spain	21st – 24th November 2013	http://www.icmol.es/elfos-hints2013/	Oral communication (ICMol, Universitat de València) Bi-stable Spin Crossover Nanoparticles	UVEG	Giménez Marqués, Mónica
Elfos-Hints 2013 **European Workshop in Molecular Spintronics**	Tenerife, Spain	21st – 24th November 2013	http://www.icmol.es/elfos-hints2013/	Oral communication (ICMol, Universitat de València): Electronic transport through metal complexes	UVEG	Ponce, Julia
Elfos-Hints 2013 European Workshop in Molecular Spintronics	Tenerife, Spain	21st – 24th November 2013	http://www.icmol.es/elfos-hints2013/	**SPECIALIZED LECTURES** Solution processed devices	UVEG	Tatay
Elfos-Hints 2013 European Workshop in Molecular Spintronics	Tenerife, Spain	21st – 24th November 2013	http://www.icmol.es/elfos-hints2013/	SPECIALIZED LECTURES Stimuli-responsive magnetic molecules	UVEG	Coronado
Elfos-Hints 2013	Tenerife, Spain	21st – 24th November 2013	http://www.icmol.es/elfos-hints2013/	Oral communication (ICMol, Universitat de València): Fabrication of robust spin-OLED's: towards the control of emitted light with an	UVEG	Prieto Ruiz, Juan Pablo

TABLE A2: LIST OF DISSEMINATION ACTIVITIES						
EVENT	**PLACE**	**DATES**	**WEBSITE**	**DISSEMINATION ACTIONS**	**PARTNER**	**PARTICIPANTS**
European Workshop in Molecular Spintronics Tenerife, Spain, November 21st – 24th, 2013				external magnetic field.		
European Workshop in Molecular Spintronics	Tenerife, Spain	22nd November 2013	http://www.icmol.es/elfos-hints2013/	Oral presentation	LiU	Mats Fahlman
European Workshop in Molecular Spintronics	Tenerife, Spain	22nd November 2013	http://www.icmol.es/elfos-hints2013/	Oral presentation	LiU	Shengwei Shi
European Symposium in Molecular Spintronics	Tenerife, Spain	21st – 24th November 2013	http://www.icmol.es/elfos-hints2013/	Organic spintronic devices: Tailoring at the interface (Invited talk)	CNRS and Thales	M. Galbiati and P. Bondavalli (Thales). K. Bouzehouane, S. Delprat, R. Mattana and P. Seneor (CNRS)
Workshop "European Workshop in Molecular Spintronics" (organized within the HINTS and ELFOS EU project)	Puerto Santiago, Tenerife, Spain	21st -24th November 2013	http://www.icmol.es/elfos-hints2013/	Talks	TCD, MLU, THALES, UVEG, NANOG, JSI, LiU, CNRS	--
European Symposium in Molecular Spintronics	Tenerife, Spain	21st – 24th November 2013	http://www.icmol.es/elfos-hints2013/	Spintronics with small molecules (contributed talks)	CNRS and Thales	M. Galbiati and P. Bondavalli (Thales). K. Bouzehouane, S. Delprat, R. Mattana and P. Seneor (CNRS)

TABLE A2: LIST OF DISSEMINATION ACTIVITIES						
EVENT	**PLACE**	**DATES**	**WEBSITE**	**DISSEMINATION ACTIONS**	**PARTNER**	**PARTICIPANTS**
58th Annual Magnetism and Magnetic Materials	Denver, USA	November 2013	http://www.magnetism.org/	Molecular Spintronics with Self-Assembled Monolayers. (contributed talk)	Thales	M. Galbiati (Thales)
Invited seminar	Soochow University, Suzhou, China	2nd December 2013	---	Invited seminar including results from HINTS	LiU	Mats Fahlman
2013 MRS Fall Meeting & Exhibit	Boston	1st – 6th December 2013	http://www.mrs.org/fall2013/	Poster "Electronic Structure of Solution Processed Donor-Acceptor Heterojunctions: The Effects of Dark State Interface Dipoles and Blend De-Mixing"	LiU	Qinye Bao, Xianjie Liu, Slawomir Braun, Shengwei Shi, Mats Fahlman
NanoSaclay nanoelectronics international workshop	Paris, France	10th – 13th December 2013	http://nanosaclay2013.ief.u-psud.fr/NANOSACLAY/HOMEPAGE.html	Large tunnel magnetoresistance effect in self-assembled monolayers based magnetic tunnel junctions (contributed talk)	CNRS and Thales	M. Galbiati (Thales). S. Delprat, R. Mattana and P. Seneor (CNRS)
Conference: XV escuela nacional de materiales moleculares	Gandía, Spain	2nd – 6th February 2014	http://www.icmol.es/XVENMM/	Preparación, caracterización y aplicaciones de monocapas autoensambladas (SAMs) – Invited Talk	UVEG	A.Forment-Aliaga.
2014 APS March Meeting	Denver, USA	March 3-7, 2014	www.aps.org/meetings/meeting.cfm?name=MAR14	Spinterfaces – results from HINTS (contributed talk)	QMUL	H Zhang
American Physical Society March Meeting	Denver, USA	3rd – 7th March 2014	http://meetings.aps.org/Meeting/MAR14/Session/Y43.13	Invited Talk	TCD	A. Droghetti
DPG Spring Meeting	Dresden (Germany)	30th March - 04th April 2014	http://dresden14.dpg-tagungen.de	Talk: "Vertical organic spin-valves with sub-micrometer lateral dimensions"	MLU	R. Göckeritz

TABLE A2: LIST OF DISSEMINATION ACTIVITIES						
EVENT	**PLACE**	**DATES**	**WEBSITE**	**DISSEMINATION ACTIONS**	**PARTNER**	**PARTICIPANTS**
DPG Spring Meeting	Dresden (Germany)	30th March - 04th April 2014	http://dresden14.dpg-tagungen.de	Talk: "Resistive switching in organic TAMR devices"	MLU	M. Grünewald
IFF-Colloquium Leibniz-Institut für Festkörper- und Werkstoffforschung (IFW) Dresden	Dresden Germany	7th April 2014		Invited Talk: Hybrid ferromagnetic metal/organic interfaces as tunable spin filters	UNIKL	M. Cinchetti
Magnetism 2014	Manchester, UK	7th-8th April, 2014	http://magnetism2014.iopconfs.org	Spinterfaces – results from HINTS (contributed talk)	QMUL	H Zhang
Invited seminar	Shanghai Institute of Organic Chemistry, Shanghai, China	28th April 2014	---	Interface phenomenon in organic electronics and spintronics	LiU	Mats Fahlman
IFF-Colloquium Leibniz-Institut für Festkörper- und Werkstoffforschung (IFW) Dresden	Dresden Germany	7th April 2014	---	Invited Talk: Hybrid ferromagnetic metal/organic interfaces as tunable spin filters	UNIKL	M. Cinchetti
European Theoretical Spectroscopy Facility	San Sebastian (Spain)	30th April 2014	---	Talk: "From organic to single molecule spintronics: a theoretical prospective on some open issues"	TCD	A. Droghetti

Dissemination activities performed and significant results

The activities carried out within the framework of the public communication and dissemination have been planned, performed and coordinated by the Project office in collaboration with the Project coordinator, and were carried on with the strong contribution of all the partners. The main objectives achieved during the course of the project have been the following:

building a **distinctive image and style** of the Project in order for HINTS to be easily recognizable.

The design and maintenance of **HINTS Web site**.

The preparation and distribution of various dissemination materials, such as the **posters**, the official **brochure** and the **flyers**.

The production of the **dissemination kit**: several gadgets used for the dissemination have been produced.

The spread of information about HINTS during **local and international events**.

Publication of scientific articles.

Publication of the **Project press release** and **external newsletter.**

The dissemination of the Project and its website through the **partners' websites**.

The Project visual identity: the LOGO, layouts, dissemination kit and website

Figure 4 – **HINTS LOGO**

The logo represents the symbol of the spin, the narrows, while the central N represents the interface. All the partners have been provided with the official logo and with the **LOGO policy document**, produce by the Project office from the idea that the power of the logo lies in its consistent and appropriate use. Therefore the document contains the guidelines on its use, standardizing the way the logo could be used within the Project. As far as the Project colours and LOGO have been chosen, the **layout of the official documents** was designed, together with the one of the presentation to be used during the internal Project meetings, and the one for public events. Moreover, starting from the layout of the LOGO, the HINTS **website** was designed and used with the aim of giving the possibility to a wide audience to get information about the Project's contents and initiatives.

The **key issues that were considered in selecting, structuring and writing content for the HINTS website are the following**:

to provide a comprehensive description of the work that is being conducted;

to successfully reach the audiences that may have an interest in HINTS potential results;

to facilitate the exchange of documents and information among the Project partners;

to make the site as transparent as possible, respecting the know-how of the partners that have to be protected.

The website was launched the 16th December 2011 (month 7 of the Project) and it can be accessed at http://www.hintsProject.eu. The private area has been developed in a second stage to offer the repository and access point for Project-related information, for use by the Project partners and of the reviewers.

An external newsletter has been created to spread information on the project. The **e-newsletter**, which has been created by the Project office with the collaboration of the whole consortium, included several information on the Project, and about the scientific community which is part of the consortium. The newsletter is downloadable from the HINTS website, where it is also possible for external users, to subscribe to the service. The first newsletter has been published in June 2012 (Month 13), while the last issue has been published at the end of the project. The newsletter is shown in the picture below.

Figure 5 – *HINTS e-newsletter*

During the course of the project, the consortium has laid the foundations to take part at important public events to promote the Project and its results, producing an efficient **dissemination kit.** In order to be ready to disseminate the Project to external audience, the Project's the brochure, the flyers and the posters were designed by the Project office and approved by the partners.

The **Project brochure** has been designed at the beginning of the Project and finally approved in May 2012. It consists of two sheets of A4 folded, in HINTS style. The external covering pages accommodate the general Project information and contact details. The internal pages describe the Project's aims and objectives.

The brochure has been uploaded in a dedicated page in the website, and several copies have been printed and distributed among the partners.

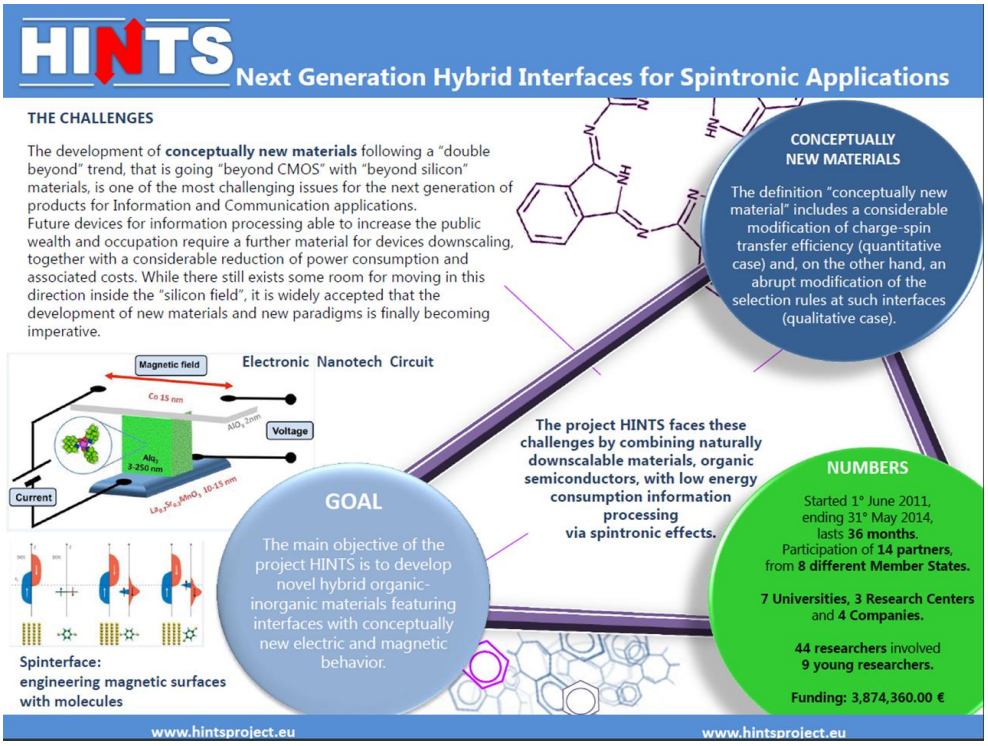

Figure 6 – *HINTS brochure: internal pages*

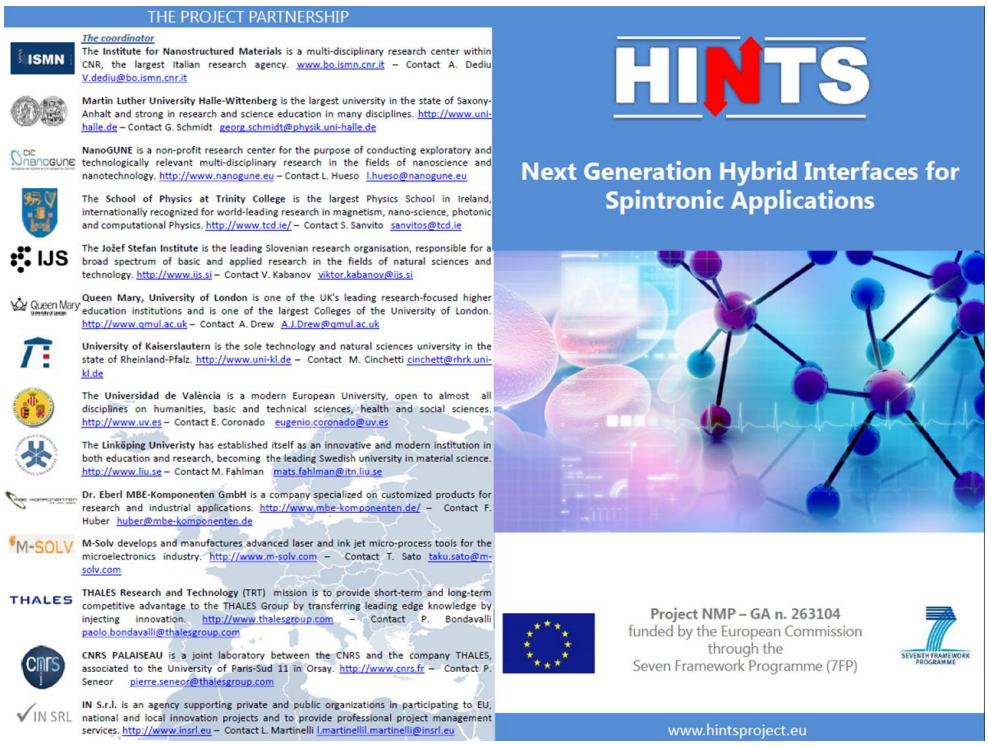

Figure 7 – *HINTS brochure: front and back page*

The flyer has been designed to substitute the brochure in particular cases, where a brief description of the Project is needed, stressing other different aspects. The flyer has been thought to be adapted at the events organized by the consortium, such as the Project workshops, and it recalls the HINTS visual identity.

The flyer produced for a Project workshop has been depicted in the picture below.

Figure 8 – *Bled lake workshop Flyer*

The dissemination kit includes also several other dissemination material that has been created for the partners, such as the HINTS **folders and the notebooks**. This material has been distributed to the consortium during the Project meetings, and it has been used by the partners to disseminate the porject at international events. The choice of what kind of gadgets we could produce, has been based on the low cost, on the effectiveness and usefulness of the gadget itself. The HINTS folders and notebooks are shown in the picture on the right

Figure 9 – *folders and notebooks*

In order to give homogeneity to the presentations that will be made by the partners during the public events, a common layout of the presentations was designed, and an official Project presentation has been prepared.

Figure 10 – *HINTS Presentation layout*

Together with the dissemination material and the Project's presentations, the partners have disseminated the Project also trough several **posters**, created for particular events and with very detailed contents on the results and the scientific activities performed in the frame of the Project. These posters are available in the Project website, at the dissemination page http://www.hintsproject.eu/16-eng-poster.html

Section B (Confidential[5] or public: confidential information to be marked clearly)

Part B1

No applications for patents, trademarks, registered designs, etc. have been done during the course of the project.

Table B1- *List applications for patents, trademarks, registered designs, etc.*

TEMPLATE B1: LIST OF APPLICATIONS FOR PATENTS, TRADEMARKS, REGISTERED DESIGNS, ETC.					
Type of IP Rights[6]:	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Application reference(s) (e.g. EP123456)	Subject or title of application	Applicant (s) (as on the application)
//	//	//	//	//	//
//	//	//	//	//	//
//	//	//	//	//	//
//	//	//	//	//	//

[5] Note to be confused with the "EU CONFIDENTIAL" classification for some security research projects.

[6] A drop down list allows choosing the type of IP rights: Patents, Trademarks, Registered designs, Utility models, Others.

Part B2

Type of Exploitable Foreground[7]	Description of exploitable foreground	Confidential	Foreseen embargo date	Exploitable product(s) or measure(s)	Sector(s) of application[8]	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
Commercial exploitation of R&D results	C25.7.3 - Manufacture of tools Machine for depositing solution based organic molecules in an inert environment	no		Equipment for electronic and spintronic components	Research laboratories, flexible electronics enterprises	Available 2014	confidential	Beneficiary M-SOLV (owner)
Commercial exploitation of R&D results	C25.7.3 - Manufacture of tools Flanges dedicated to the efficient evaporation of organics	no		Equipment for electronic and spintronic components	Research laboratories	Available 2014	confidential	Beneficiary MBE-K (owner)

[19] A drop down list allows choosing the type of foreground: General advancement of knowledge, Commercial exploitation of R&D results, Exploitation of R&D results via standards, exploitation of results through EU policies, exploitation of results through (social) innovation.
[8] A drop down list allows choosing the type sector (NACE nomenclature) : http://ec.europa.eu/competition/mergers/cases/index/nace_all.html

Type of Exploitable Foreground[9]	Description of exploitable foreground	Confidential	Foreseen embargo date	Exploitable product(s) or measure(s)	Sector(s) of application[10]	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
Commercial exploitation of R&D results	C25.7.3 - Manufacture of tools Upgraded commercial evaporator for the evaporation of sensitive organic materials on large spherical calottes (Ø ~ 1 m)	no		OME 100 Effusion Cell	Research and industrial laboratories	Available 2014	confidential	Beneficiary MBE-K (owner)
Commercial exploitation of R&D results	C25.7.3 - Manufacture of tools Upgraded commercial evaporator for the evaporation of sensitive organic materials on large flat substrates (of a few cm)	no		OME 63 Effusion Cell	Research and industrial laboratories	Available 2014	confidential	Beneficiary MBE-K (owner)

[19] A drop down list allows choosing the type of foreground: General advancement of knowledge, Commercial exploitation of R&D results, Exploitation of R&D results via standards, exploitation of results through EU policies, exploitation of results through (social) innovation.
[10] A drop down list allows choosing the type sector (NACE nomenclature) : http://ec.europa.eu/competition/mergers/cases/index/nace_all.html

As far as what reported herabove, please find hereunder some more information.

- Its purpose
    - As part of the HINTS project, M-Solv Ltd developed knowhow in the integration of ink jet and spray deposition systems in to glove boxes. These systems can be used for the development and fabrication of organic electronics where moisture and oxygen sensitive materials are used. In particular OLEDs, OPV and spintronics. Further to this processing knowledge was developed in high accuracy printing and tailoring of processes to create smooth and very flat surfaces with low Ra.
    - MBE-K has concentrated its efforts on the modification of various UHV film growth components, among which the main goals were to bring the effusion cells to a higher efficiency and lower molecular consumption.
- How the foreground might be exploited, when and by whom
    - The knowhow developed has lead to the sale of a glove box system with integrated spray system to one of the top universities in the country. This sale is worth EUR 500k. Further to this M-Solv is in the process of adding glove box R&D systems with integrated spray, ink jet and laser systems directed at large area printed electronics and hybrid processing to its line of systems that it provides.
    - HINTS has pushed for a new industrial research at the MBE-K, resulting in the modification of commercial effusion cells and other complementary products delivered mainly to research laboratories. Resulting improvements will be partially implemented in serial or customized products.
- IPR exploitable measures taken or intended
    - N/A
- Further research necessary, if any
    - N/A
- Potential/expected impact (quantify where possible)
    - Participation in the HINTS project has lead M-Solv and MBE-K to offer new equipment to their customers. This will lead to an increase in specialist machine and UHV equipment sales not only within Europe, but outside Europe as well.

Report on societal implications

A General Information *(completed automatically when **Grant Agreement number** is entered.*

Grant Agreement Number:	263104
Title of Project:	HINTS- Next Generation Hybrid Interfaces for Spintronic Applications
Name and Title of Coordinator:	Mr. Valentin Dediu

B Ethics

1. Did your project undergo an Ethics Review (and/or Screening)? If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final project reports? Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 *'Work Progress and Achievements'*	***No***
2. Please indicate whether your project involved any of the following issues (tick box) :	
RESEARCH ON HUMANS	
Did the project involve children?	***No***
Did the project involve patients?	***No***
Did the project involve persons not able to give consent?	***No***
Did the project involve adult healthy volunteers?	***No***
Did the project involve Human genetic material?	***No***
Did the project involve Human biological samples?	***No***
Did the project involve Human data collection?	***No***
RESEARCH ON HUMAN EMBRYO/FOETUS	
Did the project involve Human Embryos?	***No***
Did the project involve Human Foetal Tissue / Cells?	***No***
Did the project involve Human Embryonic Stem Cells (hESCs)?	***No***
Did the project on human Embryonic Stem Cells involve cells in culture?	***No***
Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?	***No***
PRIVACY	

Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?	***No***
Did the project involve tracking the location or observation of people?	***No***
RESEARCH ON ANIMALS	
Did the project involve research on animals?	***No***
Were those animals transgenic small laboratory animals?	***No***
Were those animals transgenic farm animals?	***No***
Were those animals cloned farm animals?	***No***
Were those animals non-human primates?	***No***
RESEARCH INVOLVING DEVELOPING COUNTRIES	
Did the project involve the use of local resources (genetic, animal, plant etc)?	***No***
Was the project of benefit to local community (capacity building, access to healthcare, education etc)?	***No***
DUAL USE	
Research having direct military use	***No***
Research having the potential for terrorist abuse	***No***

C Workforce Statistics

3. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).

Type of Position	Number of Women	Number of Men
Scientific Coordinator	2	5
Work package leaders	8	16
Experienced researchers (i.e. PhD holders)	4	13
PhD Students	2	4
Other	3	9

4. How many additional researchers (in companies and universities) were recruited specifically for this project?	6
Of which, indicate the number of men:	4

D Gender Aspects

5. Did you carry out specific Gender Equality Actions under the project?

● Yes
○ No

6. Which of the following actions did you carry out and how effective were they?

		Not at all effective				Very effective
❑	Design and implement an equal opportunity policy	○	○	○	○	○
❑	Set targets to achieve a gender balance in the workforce	○	○	○	○	○
❑	Organise conferences and workshops on gender	○	○	○	○	○
❑	Actions to improve work-life balance	○	○	○	○	○
●	Other:	Several measures were taken to guarantee the attendance of project meetings by women with little children.				

7. Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?

○ Yes- please specify
● No

E Synergies with Science Education

8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?

○ Yes- please specify
● No

9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?

● Yes- please specify: The project video
○ No

F Interdisciplinarity

10. Which disciplines (see list below) are involved in your project?

● Main discipline[11]: 1.3
● Associated discipline[11]: 2.3
○ Associated discipline[11]:

[11] Insert number from list below (Frascati Manual).

G Engaging with Civil society and policy makers

11a Did your project engage with societal actors beyond the research community? *(if 'No', go to Question 14)*	○ ●	Yes No
11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?		
● No ○ Yes- in determining what research should be performed ○ Yes - in implementing the research ○ Yes, in communicating /disseminating / using the results of the project		
11c In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?	○ ○	Yes No
12. Did you engage with government / public bodies or policy makers (including international organisations)		
● No ○ Yes- in framing the research agenda ○ Yes - in implementing the research agenda ○ Yes, in communicating /disseminating / using the results of the project		
13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers? ○ Yes – as a **primary** objective (please indicate areas below- multiple answers possible) ○ Yes – as a **secondary** objective (please indicate areas below - multiple answer possible) ● No		

13b If Yes, in which fields?

Agriculture		Energy		Human rights	
Audiovisual and Media		Enlargement		Information Society	
Budget		Enterprise		Institutional affairs	
Competition		Environment		Internal Market	
Consumers		External Relations		Justice, freedom and security	
Culture		External Trade		Public Health	
Customs		Fisheries and Maritime Affairs		Regional Policy	
Development Economic and Monetary Affairs		Food Safety		Research and Innovation	
		Foreign and Security Policy		Space	
Education, Training, Youth		Fraud		Taxation	
Employment and Social Affairs		Humanitarian aid		Transport	

13c If Yes, at which level?

- ○ Local / regional levels
- ○ National level
- ○ European level
- ○ International level

H Use and dissemination

14. How many Articles were published/accepted for publication in peer-reviewed journals?	59
To how many of these is open access[12] provided?	15
How many of these are published in open access journals?	None
How many of these are published in open repositories?	None
To how many of these is open access not provided?	44
Please check all applicable reasons for not providing open access:	
☐ publisher's licensing agreement would not permit publishing in a repository ☐ no suitable repository available ☐ no suitable open access journal available ☒ no funds available to publish in an open access journal ☒ lack of time and resources ❑ lack of information on open access ❑ other[13]:	

15. How many new patent applications ('priority filings') have been made? *("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).*		None
16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).	Trademark	NA
	Registered design	NA
	Other	NA
17. How many spin-off companies were created / are planned as a direct result of the project?		None
Indicate the approximate number of additional jobs in these companies:		NA

18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:

- ❑ Increase in employment, or
- ❑ Safeguard employment, or
- ❑ In small & medium-sized enterprises
- ❑ In large companies

[12] Open Access is defined as free of charge access for anyone via Internet.
[13] For instance: classification for security project.

❑ Decrease in employment, ❑ Difficult to estimate / not possible to quantify	x	None of the above / not relevant to the project

19. For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (*FTE = one person working fulltime for a year*) jobs: Not possible to quantify	*Indicate figure:* ❑

I Media and Communication to the general public

20. As part of the project, were any of the beneficiaries professionals in communication or media relations?

●○ Yes ○ No

21. As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public?

○ Yes ● No

22 Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?

■	Press Release	❑	Coverage in specialist press
❑	Media briefing	❑	Coverage in general (non-specialist) press
❑	TV coverage / report	❑	Coverage in national press
❑	Radio coverage / report	❑	Coverage in international press
■	Brochures /posters / flyers	■	Website for the general public / internet
❑	DVD /Film /Multimedia	■	Event targeting general public (festival, conference, exhibition, science café)

23 In which languages are the information products for the general public produced?

■	Language of the coordinator	■	English
❑	Other language(s)		

Question F-10: *Classification of Scientific Disciplines according to the Frascati Manual 2002 (Proposed Standard Practice for Surveys on Research and Experimental Development, OECD 2002):*

Fields of science and technology

1. Natural Sciences
   - 1.1 Mathematics and computer sciences [mathematics and other allied fields: computer sciences and other allied subjects (software development only; hardware development should be classified in the engineering fields)]
   - 1.2 Physical sciences (astronomy and space sciences, physics and other allied subjects)
   - 1.3 Chemical sciences (chemistry, other allied subjects)
   - 1.4 Earth and related environmental sciences (geology, geophysics, mineralogy, physical geography and other geosciences, meteorology and other atmospheric sciences including climatic research, oceanography, vulcanology, palaeoecology, other allied sciences)
   - 1.5 Biological sciences (biology, botany, bacteriology, microbiology, zoology, entomology, genetics, biochemistry, biophysics, other allied sciences, excluding clinical and veterinary sciences)

2. Engineering and technology
   - 2.1 Civil engineering (architecture engineering, building science and engineering, construction engineering, municipal and structural engineering and other allied subjects)
   - 2.2 Electrical engineering, electronics [electrical engineering, electronics, communication engineering and systems, computer engineering (hardware only) and other allied subjects]
   - 2.3. Other engineering sciences (such as chemical, aeronautical and space, mechanical, metallurgical and materials engineering, and their specialised subdivisions; forest products; applied sciences such as geodesy, industrial chemistry, etc.; the science and technology of food production; specialised technologies of interdisciplinary fields, e.g. systems analysis, metallurgy, mining, textile technology and other applied subjects)

3. Medical Sciences
   - 3.1 Basic medicine (anatomy, cytology, physiology, genetics, pharmacy, pharmacology, toxicology, immunology and immunohaematology, clinical chemistry, clinical microbiology, pathology)
   - 3.2 Clinical medicine (anaesthesiology, paediatrics, obstetrics and gynaecology, internal medicine, surgery, dentistry, neurology, psychiatry, radiology, therapeutics, otorhinolaryngology, ophthalmology)
   - 3.3 Health sciences (public health services, social medicine, hygiene, nursing, epidemiology)

4. Agricultural sciences
   - 4.1 Agriculture, forestry, fisheries and allied sciences (agronomy, animal husbandry, fisheries, forestry, horticulture, other allied subjects)
   - 4.2 Veterinary medicine

5. Social sciences
   - 5.1 Psychology

5.2 Economics

5.3 Educational sciences (education and training and other allied subjects)

5.4 Other social sciences [anthropology (social and cultural) and ethnology, demography, geography (human, economic and social), town and country planning, management, law, linguistics, political sciences, sociology, organisation and methods, miscellaneous social sciences and interdisciplinary , methodological and historical S1T activities relating to subjects in this group. Physical anthropology, physical geography and psychophysiology should normally be classified with the natural sciences].

6. Humanities

6.1 History (history, prehistory and history, together with auxiliary historical disciplines such as archaeology, numismatics, palaeography, genealogy, etc.)

6.2 Languages and literature (ancient and modern)

6.3 Other humanities [philosophy (including the history of science and technology) arts, history of art, art criticism, painting, sculpture, musicology, dramatic art excluding artistic "research" of any kind, religion, theology, other fields and subjects pertaining to the humanities, methodological, historical and other S1T activities relating to the subjects in this group]