

Project year – Press release



The HINTS project aims at advancing Spintronics by developing new hybrid organic-inorganic (HOI) materials featuring strong and tuneable spin-transfer efficiency at the interfaces.

The project HINTS, launched last 1st June 2011, has achieved its first year of life. The first results have been achieved and have been presented in Valencia, the 31st may 2012.

The HINTS project, full title: “Next Generation Hybrid Interfaces for Spintronic Applications”, is funded with 3,874,360.00 million Euro granted by the European Commission in the 7th Framework Programme.

HINTS aims at advancing Spintronics by developing new hybrid organic-inorganic (HOI) materials featuring strong and tuneable spin-transfer efficiency at the interfaces. One of the main characteristics of all organic based ICT devices is the intrinsic hybrid combination of organic active materials with inorganic electrodes. Their greatest advantage is the possibility of low-cost processing and the enormous choice of molecules, most of which are still unexplored. Crucially most of the properties of the hybrids are determined by their interfaces so that the ability to tailor the degree of interaction between organic and inorganic materials impacts the functioning of entire devices and of the electronic properties of the composite materials in general.

The ambitious approach of HINTS is implemented by designing new materials with improved spin transfer efficiency and transport. HINTS will constantly benchmark the material parameters and properties with device demands. Thus the development and the selection of HOI materials will proceed in close collaboration with and with constant feedback from the industrial and SME partners, and the entire consortium will maintain awareness of the intermediate and final ICT needs (device aspects).

The project is developing hybrid materials which exhibit the following interface functionalities:

- controlled and well defined spin selectivity as a consequence of material combination;
- tuneable interface energy barriers for controlled charge and spin injection (dipole tailoring);
- spin scattering and spin control by the insertion of monolayers of high-spin-molecules at the interfaces;
- control of the non-linear interplay of charge and spin transfer and its use for multifunctional effects.

The project has now achieved the first year of life and this was characterized by a set of encouraging results among which we can mention 1) the achievement of strong GMR modulation via both proximity effect and electrical gating at spin injecting and collecting hybrid interfaces, 2) promising preliminary results of SAM assisted TMR junctions, 3) extraordinary first observation of the GMR inversion in a GMR device via electrical field gating and 4) first modification/adjustment of the technological tools (effusion cells) as required by the needs driven by HINTS objectives.

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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. The consortium is composed by 7 Universities, 3 Research Centers and four companies spread across Europe.

The FP7 project HINTS started on the 1st of June 2011. The project held its kick-off meeting in Bologna (Italy), last *23rd – 24th June 2011*.