

# PROCEEDINGS OF SPIE

## ***Spintronics IV***

**Henri-Jean M. Drouhin**  
**Jean-Eric Wegowe**  
**Manijeh Razeghi**  
*Editors*

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# Contents

vii	<i>Conference Committee</i>
ix	<i>Introduction</i>

---

## SESSION 1 SPIN COHERENCE

---

8100 03	<b>Quantum spin Hall effect in 2D topological insulators (Invited Paper)</b> [8100-02] E. B. Sonin, The Hebrew Univ. of Jerusalem (Israel)
---------	---

---

## SESSION 2 SPIN-INJECTION I

---

8100 07	<b>Optical spin orientation in SiGe heterostructures (Invited Paper)</b> [8100-06] G. Isella, F. Bottegoni, Politecnico di Milano (Italy); F. Pezzoli, Univ. degli Studi di Milano-Bicocca (Italy); S. Cecchi, Politecnico di Milano (Italy); E. Gatti, Univ. degli Studi di Milano-Bicocca (Italy); D. Chrastina, Politecnico di Milano (Italy); E. Grilli, M. Guzzi, Univ. degli Studi di Milano-Bicocca (Italy); F. Ciccacci, Politecnico di Milano (Italy)
---------	---

---

## SESSION 3 SPIN-INJECTION II

---

8100 09	<b>Spin polarized electroluminescence and spin photocurrent in hybrid semiconductor/ferromagnetic heterostructures: an asymmetric problem (Invited Paper)</b> [8100-08] P. Renucci, T. Zhang, D. Q. Ha, V. G. Truong, Univ. de Toulouse (France); H. Jaffrès, Unité Mixte de Physique CNRS/Thales (France); L. Lombez, Univ. de Toulouse (France); P. H. Binh, Institute of Material Science (Vietnam); T. Amand, Univ. de Toulouse (France); J. M. George, Unité Mixte de Physique CNRS/Thales (France); X. Marie, Univ. de Toulouse (France)
8100 0A	<b>Optically oriented electron spin transmission across ferromagnet/ semiconductor interfaces (Invited Paper)</b> [8100-09] T. Taniyama, Tokyo Institute of Technology (Japan) and Japan Science and Technology Agency (Japan); I. Suzuki, E. Wada, Y. Shirahata, T. Naito, M. Itoh, Tokyo Institute of Technology (Japan); M. Yamaguchi, Nagoya Univ. (Japan)

---

## SESSION 4 MAGNETISM I

---

8100 0C	<b>The paradoxical role played by the angular momentum conservation in magnetization dynamics (Invited Paper)</b> [8100-11] J-E. Wegrowe, H-J. Drouhin, Ecole Polytechnique, LSI, CNRS (France) and CEA/DSM/IRAMIS (France)
8100 0D	<b>Ferromagnetic nanodisks for magnonic crystals and waveguides (Invited Paper)</b> [8100-12] R. Huber, D. Grundler, Technische Univ. München (Germany)

---

**SESSION 5 QUANTUM DOTS I**

---

- 8100 0H **Carrier and nuclear spin pumping in strain free GaAs/AlGaAs quantum dots grown by droplet epitaxy (Invited Paper)** [8100-16]  
T. Amand, B. Urbaszek, G. Sallen, S. Kunz, Univ. de Toulouse, INSA-CNRS-UPS (France); T. Kuroda, National Institute for Materials Science (Japan); T. Belhadj, Univ. de Toulouse, INSA-CNRS-UPS (France); A. Kunold, Univ. Autónoma Metropolitana-Azcapotzalco (Mexico); T. Mano, M. Abbarchi, National Institute for Materials Science (Japan); D. Lagarde, X. Marie, Univ. de Toulouse, INSA-CNRS-UPS (France); K. Sakoda, National Institute for Materials Science (Japan)
- 8100 0I **Generation of pure spin currents in a single electron transistor with a superconducting island (Invited Paper)** [8100-17]  
M. V. Costache, Catalan Institute of Nanotechnology (Spain); S. O. Valenzuela, Catalan Institute of Nanotechnology (Spain) and Institució Catalana de Recerca i Estudis Avançats (Spain) and Univ. Autònoma de Barcelona (Spain)
- 8100 0J **Single spins in quantum dots and impurities (Invited Paper)** [8100-18]  
C. E. Pryor, The Univ. of Iowa (United States)
- 8100 0K **Nuclear spin dynamics in semiconductor nanostructures (Invited Paper)** [8100-19]  
I. Tifrea, California State Univ., Fullerton (United States)

---

**SESSION 6 QUANTUM DOTS II AND MAGNETISM II**

---

- 8100 0N **Inelastic light scattering of hole spin excitations in p-modulation-doped GaAs-AlGaAs single quantum wells (Invited Paper)** [8100-22]  
M. Hirmer, M. Hirmer, T. Korn, D. Schuh, Univ. Regensburg (Germany); W. Wegscheider, ETH Zürich (Switzerland); R. Winkler, Northern Illinois Univ. (United States); C. Schüller, Univ. Regensburg (Germany)
- 8100 0O **New insights into nanomagnetism: spin-polarized scanning tunneling microscopy and spectroscopy studies (Invited Paper)** [8100-23]  
H. Oka, G. Rodary, S. Wedekind, P. A. Ignatiev, L. Niebergall, V. S. Stepanyuk, D. Sander, J. Kirschner, Max-Planck-Institut für Mikrostrukturphysik (Germany)
- 8100 0P **Single domain wall magnetoresistance electron-beam fabrication and magnetoresistance measurement (Invited Paper)** [8100-24]  
Y. Wang, C. H. de Groot, Univ. of Southampton (United Kingdom); D. Claudio-González, Univ. de Guanajuato (Mexico); M. D. B. Charlton, Univ. of Southampton (United Kingdom)

---

**SESSION 7 MULTIFERROIC AND GRAPHENE I**

---

- 8100 0Q **Enhanced spin injection efficiency and extended spin lifetimes in graphene spin valves (Invited Paper)** [8100-61]  
W. Han, J. R. Chen, K. M. McCreary, H. Wen, R. K. Kawakami, Univ. of California, Riverside (United States)
- 8100 0T **Magnetic surface states in high polarization materials (Invited Paper)** [8100-27]  
N. Wu, P. A. Dowben, Univ. of Nebraska-Lincoln (United States)

---

**SESSION 8 MULTIFERROIC AND GRAPHENE II**

---

- 8100 0W **Reconfigurable nanoelectronics using graphene based spintronic logic gates (Invited Paper)** [8100-30]  
H. Dery, H. Wu, B. Ciftcioglu, M. Huang, Y. Song, Univ. of Rochester (United States); R. Kawakami, J. Shi, Univ. of California Riverside (United States); I. Krivorotov, Univ. of California Irvine (United States); D. A. Telesca, Air Force Research Lab. (United States); I. Žutić, State Univ. of New-York at Buffalo (United States); L. J. Sham, Univ. of California San Diego (United States)

---

**SESSION 9 MgO BARRIER**

---

- 8100 0Y **Direct graphene growth on MgO(111) by physical vapor deposition: interfacial chemistry and band gap formation (Invited Paper)** [8100-32]  
J. A. Kelber, S. Gaddam, C. Vamala, S. Eswaran, Univ. of North Texas (United States); P. A. Dowben, Univ. of Nebraska-Lincoln (United States)
- 8100 0Z **Influence of lattice relaxation on the electron-spin motion in ferromagnetic films: experiment and theory (Invited Paper)** [8100-33]  
T. Berdot, A. Hallal, P. Dey, L. Tati Bismaths, L. Joly, Institut de Physique et Chimie des Matériaux de Strasbourg, CNRS, Univ. de Strasbourg (France); A. Bourzami, Univ. Ferhat Abbas de Sétif (Algeria); H. Bulou, F. Scheurer, Institut de Physique et Chimie des Matériaux de Strasbourg, CNRS, Univ. de Strasbourg (France); J. Henk, Max-Planck-Institut für Mikrostrukturphysik (Germany); M. Alouani, W. Weber, Institut de Physique et Chimie des Matériaux de Strasbourg, CNRS, Univ. de Strasbourg (France)

---

**SESSION 10 SPIN CURRENT AND SPIN-ORBIT COUPLING**

---

- 8100 12 **Probability current in presence of Spin-Orbit Interaction (Invited Paper)** [8100-36]  
F. Bottegoni, H-J. Drouhin, Ecole Polytechnique, LSI, CNRS (France) and CEA/DSM/IRAMIS (France); G. Fishman, Univ Paris-Sud, IEF, CNRS (France); J-E. Wegrowe, Ecole Polytechnique, LSI, CNRS (France) and CEA/DSM/IRAMIS (France)
- 8100 14 **Electron-beam formation from spin-orbit interactions in zinc-blende semiconductor quantum wells (Invited Paper)** [8100-38]  
D. H. Berman, M. E. Flatté, The Univ. of Iowa (United States)
- 8100 15 **Anisotropic spin dephasing in a (110)-grown high-mobility GaAs/AlGaAs quantum well measured by resonant spin amplification technique (Invited Paper)** [8100-39]  
M. Griesbeck, Univ. Regensburg (Germany); M. Glazov, Ioffe Physico-Technical Institute (Russian Federation); E. Sherman, Univ. of Basque Country (Spain); T. Korn, D. Schuh, Univ. Regensburg (Germany); W. Wegscheider, ETH Zurich (Switzerland); C. Schüller, Univ. Regensburg (Germany)

---

**SESSION 11 SPIN TRANSFER I**

---

- 8100 16 **Synchronization of high power vortex oscillators at multiple of the fundamental frequency (Invited Paper)** [8100-40]  
C. Baraduc, S. Martin, SPINTEC (France) and CEA-INAC/CNRS/UJF-Grenoble1 (France);  
C. Thirion, Institut NÉEL (France) and CNRS et Univ. Joseph Fourier (France); Y. Liu, M. Dovek,  
Headway Technologies, Inc. (United States); B. Diény, SPINTEC (France) and  
CEA-INAC/CNRS/UJF-Grenoble1 (France)
- 8100 18 **Injection locking of single-vortex and double-vortex spin-torque oscillators (Invited Paper)**  
[8100-42]  
D. E. Bürgler, V. Sluka, R. Lehndorff, A. M. Deac, A. Kákay, Forschungszentrum Juelich GmbH  
(Germany); R. Hertel, Institut de Physique et Chimie des Matériaux de Strasbourg, CNRS,  
Univ. de Strasbourg (France); C. M. Schneider, Forschungszentrum Juelich GmbH (Germany)

---

**SESSION 12 SPIN TRANSFER II**

---

- 8100 1C **Different geometries for spin-transfer oscillators (Invited Paper)** [8100-46]  
A. M. Deac, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

---

**SESSION 13 ORGANIC MATERIALS**

---

- 8100 1E **Electrical transport in a hybrid organic/inorganic heterostructure (Invited Paper)** [8100-48]  
H. Yu, M. Harberts, L. Fang, K. D. Bozdog, C.-Y. Chen, A. J. Epstein, E. Johnston-Halperin, The  
Ohio State Univ. (United States)

---

**POSTER SESSION**

---

- 8100 1J **Simulation of spin MOSFETs** [8100-53]  
A. M. Roy, Stanford Univ. (United States); D. E. Nikonov, Intel Corp. (United States);  
K. C. Saraswat, Stanford Univ. (United States)
- 8100 1L **Defect induced Raman active modes in Mn doped ZnO thin films** [8100-55]  
A. Aravind, K. Hasna, M. K. Jayaraj, Cochin Univ. of Science & Technology (India)

*Author Index*

# Conference Committee

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**Igor Zutic**, University at Buffalo (United States)

### Session Chairs

- 1 Spin Coherence  
**Henri-Jean M. Drouhin**, Ecole Polytechnique (France)
- 2 Spin-Injection I  
**Igor Zutic**, University at Buffalo (United States)
- 3 Spin-Injection II  
**Olaf M. J. van 't Erve**, U.S. Naval Research Laboratory (United States)
- 4 Magnetism I  
**Edouard B. Sonin**, The Hebrew University of Jerusalem (Israel)
- 5 Quantum Dots I  
**Franco Ciccacci**, Politecnico di Milano (Italy)
- 6 Quantum Dots II and Magnetism II  
**Scott A. Crooker**, Los Alamos National Laboratory (United States)  
**Jean-Eric Wegrowe**, Ecole Polytechnique (France)
- 7 Multiferroic and Graphene I  
**Michael E. Flatté**, The University of Iowa (United States)
- 8 Multiferroic and Graphene II  
**Nicolas Locatelli**, Unité Mixte de Physique CNRS/Thales (France)  
**Laura J. Heyderman**, Paul Scherrer Institut (Switzerland)
- 9 MgO Barrier  
**Giovanni Isella**, Laboratory for Epitaxial Nanostructures on Silicon and Spintronics (Italy)
- 10 Spin Current and Spin-Orbit Coupling  
**Emanuel Tutuc**, The University of Texas at Austin (United States)  
**Henri Jaffrès**, Unité Mixte de Physique CNRS/Thales (France)
- 11 Spin Transfer I  
**Matthieu Jamet**, Commissariat à l'Énergie Atomique (France)
- 12 Spin Transfer II  
**Jean-Eric Wegrowe**, Ecole Polytechnique (France)
- 13 Organic Materials  
**Hirofumi Oka**, Max-Planck-Institut für Mikrostrukturphysik (Germany)
- 14 Spin and Photonics  
**Henri-Jean M. Drouhin**, Ecole Polytechnique (France)



## Introduction

The fourth edition of the Spintronics symposium of the SPIE conference gathered more than sixty invited speakers in San Diego from Sunday 21st to Wednesday 24th August 2011.

As for the previous editions, the symposium covered the main topics of Spintronics, and witnessed for the dynamism of this very active field of research. These proceedings report some important results presented at the meeting.

The fourteen sessions were entitled: Spin coherence, Spin injection (two sessions), Magnetism (two sessions), Quantum Dots (two sessions), Multiferroics and Graphene (two sessions), MgO barriers, Spin currents and Spin-orbit coupling, Spin transfer (two sessions), Organic materials, and Spin and Photonics.

Some general trends in Spintronics during the last decades have been confirmed during the symposium. The fascination about Spin Hall and topological insulators can be seen from the paper by *Sonin*, and the importance of the spin-coherence in spintronic devices is confirmed from the systematic observation of spin Hall effects in lateral geometry, and from the progresses performed in optical spin-injection and detection experiments (see papers by *Giovanni et al*, *Amand et al*, *Taniyama et al*, and *Hirmer et al*). On the other hand, nanomagnetism is still a reservoir of stimulating surprises, as shown by the discussions about frustrated systems, magnonics (see paper by *Grundler*) and magnetic inertia (see paper by *Wegrowe et al*), and with the developments of new investigation tools (see papers by *Oka et al* and by *de Groot et al*). Quantum Dots are a source of well-controlled spin engineering with an important role of nuclear spins (see *Amand et al* and *Tifrea*), single electron transistors (see *Valenzuela et al*), single spin effects (see *Pryor*). For the point of view of the developments of new materials for spintronics, graphene and multiferroics are still very promising materials for new applications (see the papers by *Dowben et al*, and by *Dery*), and organic materials (see *Johnston-Halperin*). The MgO barrier (already integrated in industrial magnetic RAM units) is still the subject of intensive investigations (see the papers by *Kelber* and by *Weber et al*). The study related to spin-orbit coupling, spin currents, and resonant spin amplification are also the source of intensive efforts and important progresses are on-going (see *Bottegoni et al*, *Flatté et al*, and *Griesbek et al*). On the other hand, spin transfer studies are still enlarging their application domains with the development of spin-transfer vortex oscillators (see *Baraduc et al* and *Buergler et al*), and other systems (see *Deac* and *Claudio-Gonzales et al*).

Overall, the conference was an invaluable opportunity for open exchange and stimulating discussions in a friendly atmosphere.

We are grateful to SPIE, to the program committee, and to all speakers and authors that have made this conference a success.

**Jean-Eric Wegrowe**  
**Henri-Jean Drouhin**  
**Manijeh Razeghi**