

INFORMAȚII PERSONALE

Liviu-Petru Zarbo

📍 Str. Donat nr. 67-103, 400293 Cluj-Napoca Cluj-Napoca (România)

☎ +40 264 58 40 37/196

✉ liviu.zarbo@itim-cj.ro

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EXPERIENȚA PROFESIONALĂ

04/11/2014–Prezent

Cercetator Stiintific (CS1)

INCDTIM Cluj-Napoca, Cluj (România)

- activitati CDI
- coordonarea unei echipe de cercetare

01/01/2010–31/03/2014

Postdoctorand

Institutul de fizica al Academiei Republicii Cehe, Praga (Republica Cehă)

- activitati CDI

01/08/2007–31/12/2009

Postdoctorand

Texas A&M University, College Station (Statele Unite ale Americii)

- activitati CDI
- activitati didactice

01/09/2002–31/08/2007

Asistent/Asistent cercetator

University of Delaware, Newark (Statele Unite ale Americii)

- activitati didactice
- activitati CDI

01/09/2001–31/08/2002

Profesor de fizica

Scoala Gen. Nr. 5, Zalau (Romania)

- activitati didactice

**Experienta Didactica
Universitara**

2009 Toamna: Instructor PHYS201 la *Texas A&M University*.

2002 Toamna: Asistent pentru PHYS201 la *University of Delaware*

EDUCAȚIE ȘI FORMARE

09/2002–08/2007

Doctorat

University of Delaware, Newark (Statele Unite ale Americii)

10/2000–06/2001

Diploma de Studii Aprofundate

Universitatea Babes-Bolyai, Cluj-Napoca (România)

10/1996–06/2000 **Diploma de Licenta**
Universitatea Babes-Bolyai, Cluj-Napoca (România)

09/1992–06/1996 **Bacalaureat**
Liceul Teoretic, Zalău (România)

COMPETENȚE PERSONALE

Limba(i) maternă(e) română

Alte limbi străine cunoscute

	ÎNȚELEGERE		VORBIRE		SCRIERE
	Ascultare	Citire	Participare la conversație	Discurs oral	
engleză	C2	C2	C2	C2	C2
franceză	B1	B1	A2	A2	A2

Competențe organizaționale/manageriale

- director de proiect: coordonarea unei echipe de cercetatori.

Alte competențe

- Linux. MS Windows, HPC
- programare în Fortran 77/95, C, C++, JAVA, Python.
- Scientific software: Mathematica, Maple, Turbomole, Gaussian, etc.

INFORMAȚII SUPLIMENTARE

Proiecte castigate

Responsabil proiect: 2010-2012 EU FP7 Project NAMASTE No. 2.

Director de proiect: 2015-2017: *Universal Multiscale Simulations for Hydrogen Storage in Novel Materials*, UEFISCDI, PN-II-RU-TE-2014-4-1309, Romania.

Director de proiect partener 2018-2020: *Dezvoltarea informatiei si a tehnologiilor cuantice in Romania*, UEFISCDI, PN-III-P1-1.2-PCCDI-2017-0338.

Premii

University of Delaware Dissertation Fellowship (2006).

Afilieri profesionale

Membri, American Physical Society.

Programe de simulare dezvoltate

- program de transport cuantic (Landauer-Buttiker) pentru simularea transportului de spin și sarcina în nanostructuri și grafena;
- program bazat pe funcții Green de neechilibru pentru calculul sarcinii, spinului și curenților locali în nanostructuri;
- simulare semiclasică Monte Carlo pentru studiul difuziei de spin în microcanalele tranzistorilor de spin;
- program k.p pentru studiul momentelor de spin în semiconductori magnetici.
- Pachet de programe pentru simulări multiscale a adsorbției de hidrogen în structuri metal-organice.

Publicatii (peste 900 citari)

1. B. K. Nikolic, S. Souma, L. P. Zarbo, and J. Sinova, *Nonequilibrium spin Hall accumulation in*

- ballistic semiconductor nanostructures*, Phys. Rev. Lett. **95**, 046601 (2005).
2. B. K. Nikolic, L. P. Zarbo, and S. Welack, *Transverse spin-orbit force in the spin Hall effect in ballistic quantum wires*, Phys. Rev. B **72**, 075335 (2005).
 3. B. K. Nikolic, L. P. Zarbo, and S. Souma, *Mesoscopic spin Hall effect in multiprobe spin-orbit coupled ballistic semiconductor bridges*, Phys. Rev. B **72**, 075361 (2005).
 4. B. K. Nikolic, L. P. Zarbo, and S. Souma, *Imaging mesoscopic spin Hall flow: Spatial distribution of local spin currents and spin densities in and out of multiterminal spin-orbit coupled semiconductor nanostructures*, Phys. Rev. B **73**, 075303 (2006).
 5. B. K. Nikolic and L. P. Zarbo, *Extrinsically Versus Intrinsically Driven Spin Hall Effect in Disordered Mesoscopic Multiterminal Bars*, Europhys. Lett. **77**, 47004 (2007).
 6. L. P. Zarbo and B. K. Nikolic, *Spatial distribution of local currents of massless Dirac fermions in quantum transport through graphene nanoribbons*, Europhys. Lett. **80**, 47001 (2007).
 7. Alexey A. Kovalev, Liviu P. Zarbo, Y. Tserkovnyak, G. E. W. Bauer, Jairo Sinova, *Piezospin Polarization of Currents in Nanostructures*, Phys. Rev. Lett. **101**, 036401 (2007).
 8. R. L. Dragomirova, L. P. Zarbo and B. K. Nikolic, *Spin and Charge Shot Noise in Mesoscopic Spin Hall Systems*, Europhys. Lett. **84**, 37004 (2008).
 9. B. K. Nikolic, L. P. Zarbo, and S. Souma, *Spin Currents in Semiconductor Nanostructures: A Nonequilibrium Green-Function Approach*, Chapter 24, page 814 in Volume I of "The Oxford Handbook on Nanoscience and Technology: Frontiers and Advances," Eds. A. V. Narlikar and Y. Y. Fu (Oxford University Press, Oxford, 2010).
 10. J. Wunderlich, A. C. Irvine, Jairo Sinova, B. G. Park, L. P. Zarbo, X. L. Xu, B. Kaestner, V. Novak, T. Jungwirth, *Spin-injection Hall effect in a planar photovoltaic cell*, Nature Physics **5**, 675 (2009).
 11. Liviu P. Zarbo, Jairo Sinova, Irena Knezevic, J. Wunderlich, T. Jungwirth, *Modeling of diffusion of injected electron spins in spin-orbit coupled microchannels*, Phys. Rev. B **82**, 205320 (2010).
 12. J. Wunderlich, B. G. Park, A. C. Irvine, L. P. Zarbo, E. Rozkotova, P. Nemeč, V. Novak, Jairo Sinova, T. Jungwirth, *Spin Hall effect transistor*, Science **330**, 1801 (2010).
 13. D. Fang, H. Kurebayashi, J. Wunderlich, K. Vyborny, L. P. Zarbo, R. P. Campion, A. Casiraghi, B. L. Gallagher, T. Jungwirth, and A. J. Ferguson, *Spin-orbit driven ferromagnetic resonance*, Nature Nanotechnology **6**, 413 (2011).
 14. C. Ciccarelli, L. P. Zarbo, A. C. Irvine, R. P. Campion, B. L. Gallagher, J. Wunderlich, T. Jungwirth, A. J. Ferguson, *Spin gating electrical current* APL **101**, 122411 (2012).
 15. H. Kurebayashi, Jairo Sinova, D. Fang, A. C. Irvine, J. Wunderlich, V. Novak, R. P. Campion, B. L. Gallagher, E. K. Vehstedt, L. P. Zarbo, K. Vyborny, A. J. Ferguson, T. Jungwirth, *An anti-damping spin-orbit torque originating from the Berry curvature*, Nature Nanotechnology **9**, 211 (2014).
 16. Gonzalez-Zalba, MF, Ciccarelli, C., Zarbo, LP, Irvine, AC, Campion, RC, Gallagher, BL, Jungwirth, T, Ferguson, AJ, Wunderlich, J., *Reconfigurable Boolean Logic Using Magnetic Single-Electron Transistors*, PLOS ONE, **10**, 4, e0125142 (2015).
 17. Hang Li, H. Gao, Liviu P. Zârbo, K. Vyborný, Xuhui Wang, Ion Garate, Fatih Doğan, A. Čejchan, Jairo Sinova, T. Jungwirth, and Aurélien Manchon, *Intraband and interband spin-orbit torques in noncentrosymmetric ferromagnets*, Phys. Rev. B **91**, 134402 (2015).
 18. Daniel Bilc, Liviu P. Zarbo, Sorina Garabagiu, Eric Bousquet, and Liliana Mitoseriu, *High field properties of typical perovskite ferroelectrics by first-principles modeling*, submitted (2016).
 19. Daniel I. Bilc, Calin G. Floare, Liviu P. Zârbo, Sorina Garabagiu, Sebastien Lemal, and Philippe Ghosez, *First-Principles Modeling of SrTiO₃ Based Oxides for Thermoelectric Applications*, J. Phys. Chem. C, **120**, 5678 (2016).
 20. Liviu P. Zarbo, Marius A. Oancea, Manolis Klontzas, Manolis Tyllianakis, Ioana G. Grosu, George Froudakis, *Electrically enhanced hydrogen adsorption in metal-organic frameworks*, 10.26434/chemrxiv.8209304.v1 (2019).

Conferințe

- *Vibrations in Glasses Encounter Quantum Chaos*. APS March Meeting 2003, Austin, Texas.
- *Pure and Impure Spin Currents in Mesoscopic Four-Probe Semiconductor Nanostructures with Rashba and Dresselhaus Spin-Orbit Couplings*.

APS March Meeting 2005, Los Angeles, California.

- *Mesoscopic Spin Hall Currents and Spin Densities in Multiprobe Ballistic Semiconductor Nanostructures.*

SPINTECH III, Awaji Island, JAPAN August 1-5, 2005.

- *Imaging Stationary Flow of Spin Hall Effect-Induced Spin Densities in Mesoscopic Nanostructures.*

APS March Meeting 2006, Baltimore, Maryland.

- *Mesoscopic spin Hall effect.*

Max Planck Institute, Halle, Germania 2007, invited.

- *Imaging massless Dirac fermion flow in graphene nanoribbons.*

APS March Meeting 2008, New Orleans, Louisiana.

- *Monte Carlo Simulation of Spin-Injection Hall Effect.*

APS March Meeting 2009, Pittsburgh, Pennsylvania.

- *Monte Carlo Simulation of Spin-Injection Hall Effect in Spintronic Devices.*

Techcon 2009, Austin, Texas.

- *Modeling of diffusion of injected electron spins in spin-orbit coupled microchannels.*

APS March Meeting 2011, Dallas, Texas.

- *Current Induced Spin Torque in Uniform Semiconducting Ferromagnets.*

2nd Advanced Workshop on Spin and Charge Properties of Low Dimensional Systems, Brasov, Romania, 2011.

- *Current Induced Spin Torque in Uniform Semiconducting Ferromagnets.*

Frontiers of Quantum and Mesoscopic Thermodynamics 2011, Prague, Czech Republic.

- *Spin-gating of a conventional aluminum single electron transistor.*

APS March Meeting 2012, Boston, Massachusetts.

- *Antidamping Spin Orbit Torque in Semiconducting Ferromagnets.*

Frontiers of Quantum and Mesoscopic Thermodynamics 2013, Prague, Czech Republic.

- *Spin-Orbit Torques in Semiconductor Ferromagnets*

Processes in Isotopes and Molecules 2015, Cluj-Napoca, Romania.

- *Influence of electric field on methane adsorption in metal-organic frameworks,*

College on Multiscale Computational Modeling of Materials for Energy Applications 2016, Trieste, Italy.

- *Electric fields as means to improve the hydrogen storage capacity of metal-organic frameworks,*

EMR 2017, Lisbon, Portugal.

- *Increasing the hydrogen storage capacity of IRMOF-1 via applied electric fields,*

Nanotech 2017, Paris, France.

- *Properties of Thermoelectric Oxide and Silicide Thin Films,* Euronanoforum 2019, Bucharest, Romania.