

CONTACT

Department of Theoretical Physics
Horia Hulubei National Institute of Physics and Nuclear Engineering
077125 Bucharest–Măgurele, Romania
+40 21 404 2300 ext. 3405
r.ionicioiu@theory.nipne.ro
<http://www.theory.nipne.ro/index.php/ionicioiu-frontpage>

EDUCATION

- 10/1995 – 01/1999 **PhD** theoretical physics, **University of Cambridge** (1999)
Department of Applied Mathematics and Theoretical Physics (DAMTP)
PhD thesis: *Topology in 3-dimensional Quantum Gravity*
supervisor: Dr Ruth M. Williams
- 10/1993 – 06/1994 **Master of Mathematics**/Master of Advanced Study (Part III of the Mathematical Tripos), **University of Cambridge** (1994)
Department of Applied Mathematics and Theoretical Physics (DAMTP)
- 09/1986 – 06/1991 **MSc** theoretical physics, **University of Bucharest**, Faculty of Physics (1991)
MSc thesis: *The Inflationary Model of the Early Universe* (10/10)

PROFESSIONAL EXPERIENCE

- 01/2013 – **Senior Researcher I**, Department of Theoretical Physics, Horia Hulubei National Institute of Physics and Nuclear Engineering, Bucharest, Romania
- 02/2014 – 11/2016 **Senior Researcher I**, Research Center for Spatial Information CEOSpaceTech, University Politehnica of Bucharest, Romania
- 06/2011 – 09/2012 **Research Assistant Professor, Institute for Quantum Computing**, University of Waterloo, Canada
- 03/2010 – 03/2011 **Research Fellow, Macquarie University**, CQCT, Sydney, Australia
- 01/2007 – 10/2009 **Research Fellow, Hewlett-Packard Labs**, Bristol, UK
- 07/2000 – 12/2006 **Research Scientist and Senior Researcher** (from 2002), **Institute for Scientific Interchange (ISI)**, Torino, Italy
- 01/1999 – 06/2000 **Postdoctoral Research Associate, University of Cambridge**, Engineering Department, UK
- 01/1995 – 10/1995 **Research assistant, Institute of Gravitation and Space Sciences**, Bucharest, Romania
- 12/1992 – 09/1993 **Research assistant, Research Institute for Informatics (ICI)**, Bucharest

AWARDS AND SCHOLARSHIPS

2014	Dragomir Hurmuzescu Prize of the Romanian Academy
2000	Best Paper Award , IEEE International Semiconductor Conference CAS 2000
1998 – 1999	Fellow of Cambridge Philosophical Society , Cambridge, UK
1998	Taussky-Todd Scholarship , Girton College, Cambridge
1997	J.T. Knight Prize , for the essay: <i>Building Blocks in Turaev-Viro Theory</i> , Cambridge
1995 – 1998	ORS Award, Cambridge Overseas Trust Scholarship and Ratiu Foundation Fellowship toward research for a PhD degree, University of Cambridge
1995	Cambridge European Trust Honorary Scholar Award , Cambridge
1993 – 1994	Soros-Cambridge Scholarship for study toward a Certificate of Advanced Studies in Mathematics (Part III of the Mathematical Tripos), University of Cambridge
1990	JINR Dubna Scholarship , Dubna, Russia
1990 – 1991	Scholarship for Exceptional Merit , University of Bucharest

PROFESSIONAL, TEACHING, FUNDRAISING, other

- **Referee:** Nature Physics, Nature Communications, Phys. Rev. (Lett., A, B), Appl. Phys. Lett., New J. Phys., Proc. Roy. Soc. A, J. Phys. A, Quantum Information Processing, Europhys. Lett. Project reviewer for Romanian Space Agency (ROSA)
- **Patents:** Co-author of 4 United States patents, Hewlett-Packard Labs (2009-2012)
- **Membership:** American Association for the Advancement of Science (AAAS) (2012 –), American Physical Society (APS) (2011–2016)
- **Grants:** Node coordinator (ISI) in writing-up a grant investigating free-space QKD; joint proposal between ISI, Alenia Spazio, IENGF and Politecnico di Torino (€340,000 from Piedmont Region, 2006)
- **Teaching:** partial responsibilities in supervising PhD students at ISI as a Senior Researcher; supervisions given at Cambridge University (1997-8)
- **Languages:** English (fluent), Italian (fluent), French (good), Romanian (native)
- **Computing:** Maple, Matlab/Octave, Maxima, Mathematica, L^AT_EX, Linux, C, Pascal, FORTRAN

RESEARCH INTERESTS

quantum information, quantum computation, foundations of quantum mechanics, quantum technologies, architectures for photonic quantum computing, quantum communication, measurement-based quantum computation, solid state implementations, entanglement in spin systems, topological quantum gates

PUBLICATIONS, PATENTS – see attached list

INVITED AND CONTRIBUTED TALKS

1. *Future quantum technologies*, National Institute for Microtechnologies, Bucharest, 16 March 2017
2. *Quantum technologies 2.0*, Quantum Optics and Quantum Imaging Summer School, Bucharest, 4-6 July 2016
3. *Quantum light: mysteries, paradoxes and future technologies*, Lights of the World, IYL2015 Conference, Bucharest, 30 October 2015
4. *The second Quantum Revolution: from paradoxes to 21st century technology*, Bușteni Summer School, 24 July 2015
5. *A quantum leap for technology*, Quantum Imaging and Quantum Metrology Summer School, Bucharest, 1-3 July 2015
6. *Quantum: technologies for the 21st century*, Faculty of Electronics, Bucharest, April 2015
7. *Complementarity: from wave-particle duality to delayed-choice experiments*, Faculty of Philosophy, Bucharest, October 2014
8. *A quantum delayed-choice experiment*, Advanced many-body and statistical methods in mesoscopic systems, Brașov, 1-5 September 2014
9. *Quantum information: turning paradoxes into technologies*, Quantum Information and Quantum Technologies Summer School, Bucharest, 2-4 July 2014
10. *Encoding graphs into quantum states: an axiomatic approach*, DFT, IFIN-HH, Bucharest, October 2013
11. *Misterele lumii cuantice*, Bucharest Science Festival, 26 September 2013
12. *Quantum technologies: launching the second quantum revolution*, New Trends in Nanophysics, INFM Workshop, Bucharest, September 2013
13. *a quantum kōan*, **TEDxCERN@IFIN-HH**, Bucharest, 17 May 2013
<https://www.youtube.com/watch?v=stsJaW3H-SA>
14. *Entangling by measurement: the generalized parity box*, DFT Quantum Information Workshop, Bucharest, April 2013
15. *Quantum information: turning paradoxes into technology*, IFIN-HH, March 2013
16. *Quantum information: turning paradoxes into technology*, Politechnica University Bucharest, February 2013
17. *Einstein, Wheeler, Bohr: from classical to quantum delayed-choice*, DFT, IFIN-HH, Bucharest, September 2012
18. *Encoding graphs into quantum states: an axiomatic approach*, IQC, Waterloo, September 2012
19. *Is classical set theory compatible with quantum experiments?*, Perimeter Institute, Waterloo, April 2012; <http://pirsa.org/displayFlash.php?id=12040107>
20. *A quantum delayed-choice gedanken experiment*, APS March Meeting, Boston, March 2012
21. *Einstein, Wheeler, Bohr: from classical to quantum delayed-choice*, IQC, Waterloo, September 2011
22. *From graphs to quantum states (...and hopefully back)*, Macquarie University, Sydney, August 2010

23. *From photonics to quantum photonics: towards an optical QIP chip*, Macquarie University, Sydney, June 2010
24. *From graphs to quantum states (...and hopefully back)*, University of Leeds, January 2010
25. *Generalized parity measurements: an entanglement resource*, University of Waterloo, October 2009
26. *Putting Quantum into Photonics: towards an optical QIP chip*, IQC, Waterloo, October 2009
27. *Efficient preparation of 2D and 3D clusters*, Quantum Photonics Workshop, Bristol, September 2009
28. *Mapping graphs to quantum states*, ISI Torino, Italy, July 2009
29. *From graphs to quantum states*, University of Hertfordshire, Hatfield, UK, March 2009
30. *Generalized parity module: an entanglement resource*, QUOXIC Workshop, Oxford, December 2008
31. *Generalized parity measurements*, University of Southern California, Los Angeles, September 2008
32. *Towards an optical QIP chip*, Hewlett-Packard Labs, Palo Alto, September 2008
33. *Entangling with parity measurements*, National Institute of Informatics, Tokyo, April 2008
34. *QIP with topological effects: a tale of spin, charge and qubits*, HP QIP meeting, Bristol, September 2007
35. *Entangling spins by measuring charge: A parity gate toolbox*, International Workshop on “Measurement-based quantum computing (MBQC)”, Oxford, March 2007
36. *Entangling spins by measuring charge*, Workshop on “Advances in Foundations of Quantum Mechanics”, Torino, Italy, May 2006
37. *Groups n ’ states (and some entanglement)*, TOPQIP-05 Workshop, Torino, Italy, July 2005
38. *Zen and the art of entanglement (entanglement in lattice spin systems)*, TOPQIP-04 Workshop, Torino, Italy, June 2004
39. *Quantum gates with topological phases*, TOPQIP-04 Workshop, Torino, Italy, June 2004
40. *Single spin measurement using spin-orbital entanglement*, SSQIP Conference, Amsterdam, December 2003
41. *Quantum information processing in bosonic lattices*, Istituto Galileo Ferraris, Torino, Italy, November 2003
42. *Spintronic devices as quantum gates*, ISI Workshop, Torino, Italy, February 2003
43. *Anyons, topology and knots: a link to entanglement?*, ISI Torino, Italy, December 2002
44. *Quantum computation in ballistic quantum wires*, Engineering Department, Cambridge, June 2001
45. *Testing Bell’s inequality with ballistic electrons*, ISI workshop, Torino, Italy, June 2001
46. *Quantum entanglement: how to do it with ballistic electrons*, ISI Torino, Italy, January 2001
47. *Quantum computation: some like it entangled*, Università di Modena, Italy, December 2000
48. *QC with ballistic electrons*, Cavendish Laboratory, Cambridge, January 2000
49. *Solid state implementations of quantum gates*, Isaac Newton Institute, Cambridge, July 1999
50. *A gentle introduction to quantum computation*, Engineering Department, Cambridge, March 1999

51. *Topology change in 3D – in the search for the building blocks*, Workshop on “New directions in simplicial quantum gravity”, Santa Fe, July 1997
52. *Building blocks in Turaev-Viro theory*, DAMTP, Cambridge, 1996

PROFESSIONAL ACTIVITIES

1. Organizer, *Quantum Optics and Quantum Imaging* Summer School, Bucharest, 4-6 July 2016
2. Organizer, *Quantum Imaging and Quantum Metrology* Summer School, Bucharest, 1-3 July 2015
3. Organizer, *Quantum Information and Quantum Technologies* Summer School, Bucharest, 2-4 July 2014

MEDIA

PRINT

1. *Time travel and the single atom*, in **Cosmos Magazine**, 22 June 2015
<https://cosmosmagazine.com/physical-sciences/time-travel-and-single-atom>
2. *Quantum shadows*, cover story in **New Scientist**, 5 January 2013
<http://bit.ly/1NTxqMP>
3. *Le photon défie toujours l'intuition*, **Le Monde**, 1 November 2012; article discussing our *gedanken-experiment* and its implementation
<http://bit.ly/1N2iTM5>

TV

1. Invited guest on *Ora de stiri* discussing the discovery of gravitational waves, TVR 2, 12 February 2016

RADIO

1. *Quantum Europe*, invited guest on the radio show *Lumea în care vom trăi*, Radio România Cultural, 6 June 2016
2. *Our quantum future*, invited guest on the radio show *Lumea în care vom trăi*, Radio România Cultural, 1st February 2016
3. *Quantum technologies*, invited guest on the radio show *Lumea în care vom trăi*, Radio România Cultural, 14 July 2014
4. *Fizica marilor concepte, fizicienii marilor idei*, Cafeneaua de Știință, radio talk-show on Radio România Cultural, 6 January 2014
5. *Born in Romania*, interview on Radio România Cultural, 4 June 2013
6. *Philosophical challenges of the quantum world*, invited guest on the radio show *Izvoare de filosofie*, Radio România Cultural, 3 November 2012
7. Interviews on *Radio România Actualități* and *Radio România Cultural* discussing the 2012 Nobel Prize for Physics, 9-10 October 2012