
Michał Oszmaniec

Scientific Experience

- 2005-2010 University of Warsaw, Faculty of Physics, Poland
Five years of master studies in physics, specialization: theoretical physics
- 2011 Work in Scope Fluidics (affiliated to Institute of Physical Chemistry PAS in Warsaw).
- 2012-now Assistant in Center for Theoretical Physics PAS in Warsaw (starting February 2015 on unpaid holidays)
- 01.2015 University of Warsaw, Faculty of Physics, Poland, PhD in Theoretical Physics (graduated with honours), Thesis title: "Applications of differential geometry and representation theory to description of quantum correlations", supervisor: Prof. Marek Kuś
- 02.2015-05.2017 Postdoc in the Quantum Information Group of prof. Antonio Acin, ICFO, Barcelona
- 06.2017-now Postdoc founded from the Homing grant of FNP, University of Gdańsk

Research Interests

Quantum information theory and quantum computing

Foundations of quantum mechanics

Mathematical physics

Participation in research projects

NCN grant „Symetrie i uniwersalność w układach mezoskopowych”, DEC-2011/M/ST2/00379, Director of the grant: prof. Marek Kuś

"Topology and Geometry of quantum correlations", IP2011048471, MNiSW; Iuventus Plus 2012; Principal investigator: dr Adam Sawicki

ERC Advanced Grant "QOLAPS: Quantum resources: conceptuals and applications", principal investigator: prof. Ryszard Horodecki

NCN grant Preludium 5 "Application of concentration of measure phenomenon to description of correlations in quantum systems", Principal investigator: Michał Oszmaniec

ERC Consolidator Grant QITBOX, principal investigator: prof. Antonio Acin

Homing grant from Foundation of Polish Science, start of the grant: 2017, Principal investigator: Michał Oszmaniec

Patents

Co-author of patent applications (with Piotr Garstecki and Paweł Dębski)

2011 Patent application number: P-397028, Title: "Sposób przeprowadzania cyfrowych oznaczeń analitycznych i diagnostycznych" [DPCR-v1], date of application: 17th of November 2011

2011 Patent application number: P-397027, Title: "Sposób przeprowadzania cyfrowych oznaczeń analitycznych i diagnostycznych" [DPCR-v2], date of application: 17th of November 2011

2012 International patent PCT/EPO 2780470 "Method for performing quantitation assays", based on PL397028, PL397027 and PL397026", 17th November 2012

Publications

1. M. Oszmaniec, D. J. Brod, "Classical simulation of photonic linear optics with lost particles", [arXiv:1801.06166](#) (submitted to Physical Review X)
2. M. Oszmaniec and Z. Zimboras, *Phys. Rev. Lett.* 119, 220502 (2017)
3. M. Oszmaniec, L. Guerini, P. Wittek, A. Acin, *Phys. Rev. Lett.* 119, 190501 (2017)
4. S. Altenburg, M. Oszmaniec, S. Wölk, and O. Gühne, *Phys. Rev. A* 96, 042319 (2017)
5. A. Sawicki, T. Maciążek, M. Oszmaniec, K. Karnas, K. Kowalczyk-Muryńska, M. Kuś, "Multipartite quantum correlations: symplectic and algebraic geometry approach", [arXiv:1701.03536](#) (submitted to ROMP)
6. M. Oszmaniec, R. Augusiak, C. Gogolin, J. Kołodyński, A. Acín, M. Lewenstein, *Physical Review X* 6 (4), 041044 (2016)
7. M. Oszmaniec, A. Grudka, M. Horodecki, A. Wójcik, *Phys. Rev. Lett.* 116, 110403 (2016)
8. W. Kłobus, M. Oszmaniec, R. Augusiak, A. Grudka, *Foundations of Physics* 46 (5), 620-634 (2016)
9. M. Oszmaniec, J. Gutt and M. Kuś, *Phys. Rev. A* 90, 020302(R) (2014)
10. M. Oszmaniec and M. Kuś, *Phys. Rev. A* 90, 010302(R) (2014)
11. P. Migdał, J. Rodríguez-Laguna, M. Oszmaniec, and M. Lewenstein, *Phys. Rev. A* 89, 062329 (2014)
12. M. Oszmaniec, P. Suwara and A. Sawicki, *J. Math. Phys.* 55, 062204 (2014)
13. A. Sawicki, M. Oszmaniec and M. Kuś, *Rev. Math. Phys.* 26, 1450004 (2014)
14. M. Oszmaniec and M. Kuś, *Phys. Rev. A* 88, 052328 (2013)
15. T. Maciążek, M. Oszmaniec and A. Sawicki, *J. Math. Phys.* 54, 092201 (2013)
16. A. Sawicki, M. Oszmaniec and M. Kuś, *Phys. Rev. A* 86, 040304(R) (2012)
17. M. Oszmaniec and M. Kuś, *J. Phys. A: Math. Theor.* 45 244034 (2012)

Recent international cooperation

- 2015-2017: Postdoc in the ICFO group of quantum information led by prof Antonio Acin
- 2017-now: Ongoing collaboration with the ICFO group of quantum information led by prof Antonio Acin (Matteo Lostaglio, Joseph Bowels, Jan Kolodyński)
- 2016-now: Collaboration with the Otfird Ghune's group at Univeristy of Siegen (Germany) - resulted in [4]
- 2015-now: Collaboration with Zoltan Zimboras (UCL, Frie Universitet Berlin, Wigner Research Centre) resulted in the publication [2]
- 2016-now: Collaboration Daniel Brod (Rerimeter Institute in Canada, UFF in Niteroi, Brazil) - resulted in the publication [1]
- 2015-now: Collaboration with Barbara Terhal on power of fermionic qunam computation (two months of short visits in total)
- 2016-now: Collaboration with Jens Eisert's group at Freie Universitat Berlin (Jens Eisert and Juan Bermejo Vega) on contextuality in systems of Majorana Fermions (two weeks of short stays in total)

Most important international talks

- 24 May 2013 - Invited talk "Generalized concurrence for arbitrary bosonic and fermionic systems" - Symposium of KCIK, Sopot, Poland

- 23 May 2014 - Invited talk "On Classical Simulation of Fermionic Linear Optics Augmented with Noisy Ancillas", Symposium of KCIK, Sopot, Poland
- 10 July 2015 - Talk "Creating superpositions of unknown quantum states", 22nd Central European Workshop on Quantum Optics, Warsaw, Poland
- 15 August 2015, Talk "Almost all symmetric states attain the Heisenberg limit in metrology", V Paraty Quantum School and Workshop, Paraty, Brazil
- 6 October 2015, Invited talk "Creating a superposition of unknown quantum states", Quantum Information Group Seminar at University College London, London, England
- 26 October 2015, Invited talk "Metrological properties of typical quantum states", Institute for Quantum Information, Aachen, Germany
- 20 January 2016, Invited talk "Random symmetric states for robust quantum metrology", Perimeter Institute for Theoretical Physics, Waterloo, Canada
- 22 February 2016, Invited talk "Algebraic geometric aspects of superpositions of unknown quantum states", Jacobs University, Bremen, Germany
- 7 July 2016, "Random bosonic states for robust quantum metrology", contributed talk during the conference QCMC 2016, Singapore
- 12 July 2016, Invited talk "Simulation of general positive-operator-valued measures by projective measurements", Center for Quantum Technologies, Singapore
- 24 September 2016, "Measuring the magnetic-field gradient using decoherence-free subspaces", Invited talk during the conference "Quantum Technologies VII", Warsaw, Poland
- 7 November 2016, Invited talk "Simulating positive-operator-valued measures by projective measurements", Nicolas Brunner group at University of Geneva, Switzerland
- 15 June 2017, "Simulation of positive-operator-valued measures with projective measurements", contributed talk during the conference TQC 2017, Paris, France
- 22 August 2017, "Universal extensions of restricted classes of quantum operations", contributed talk during the conference "VI Paraty Quantum information workshop", Paraty, Brazil
- 8 September 2017, "Universal extensions of restricted classes of quantum operations", contributed talk during the conference AQIS 2017, Singapore
- 23 January 2018, Invited talk "Classical simulation of boson sampling with lost photons", ICFO, Barcelona, Spain

Honors and Awards

2005	Team Leader of the Polish National Team during International Young Physicist's Tournament (prize of 3rd place), Winterthur - Switzerland
2008-9	Student Scholarship of Polish Minister of Science and Higher Education (Poland)
2011	Team Leader of the Polish National Team during International Young Physicist's Tournament (prize of 3rd place), Teheran - Iran
2015	Awarded a scholarship "Start" of the Foundation for Polish Science

Other scientific activities

- **Supervision of students:** Piotr Suwara and Tomasz Maciazek (interns in CFT PAS, publications [8] and [11]), Jaume De Dios Pont (intern in Summer 2016 in ICFO), Filip Maciejewski (within Homing project)
- **Supervision of PhD students:** Leonardo Guerini (PhD in ICFO, publication [3]), Sanah Altenburg (Siegen, publication [4]), Swati Sinh (within Homing project)
- Organiser of Symposium in honour of Marek Kuś 60th birthday (April 2015)
- Referee for journals: Physical Review Letters, Physical Review X, Physical Review A, Quantum Information and Quantum Computation, International Journal of Quantum Information;