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Centre for Quantum Information & Communication (QuIC)
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Citizenship

Russia

Education**University of Camerino**

Italy. *Feb 2007 – Mar 2010*

Doctor of Philosophy, Physics

Focus: Information transmission through Gaussian quantum channels
with memory

Supervisor: Prof. Stefano Mancini

P. N. Lebedev Physical Institute of the Russian Academy of Sciences

Moscow, Russia. *Jul 2006 – Aug 2009*

Doctor of Philosophy, Physics

Focus: Probability representation of quantum mechanics, symplectic
and spin tomography

Research project: Some questions on application of probability representation
in quantum mechanics

Supervisor: Prof. Vladimir Man'ko

Moscow Institute of Physics and Technology (State University)

Moscow, Russia. *Sep 2004 – Jun 2006*

Master of Science in Physics, Faculty of Physics and Power Problems

Major: Applied mathematics and physics

Focusing on plasmic power engineering

Research project: Development of tomographic representation approach
for solution of some problems in mechanics

Advisors: Prof. Vladimir Man'ko and Prof. Anatoliy Napartovich

Moscow Institute of Physics and Technology (State University)

Moscow, Russia. *Sep 2001 – Jun 2004*

Bachelor of Science in Physics, Faculty of Physics and Power Problems

Major: Applied mathematics and physics

Focusing on plasmic power engineering

Research project: Study of optical properties of plane-layered structures

Advisor: Prof. Anatoliy Napartovich

Altai State University

Barnaul, Russia. *Sep 1999 – Jun 2001*

Faculty of Physics and Technology

Major: Radiophysics and electronics

Journal publications

Here and below main
coauthor is underlined

Capacities of bosonic Gaussian quantum channels

- [1] J. Schäfer, E. Karpov, O. V. Pilyavets, N. J. Cerf. *Gaussian capacity of the single-mode Gaussian channel*. [To be submitted] (2015).
- [2] J. Schäfer, E. Karpov, R. García-Patrón, O. V. Pilyavets, N. J. Cerf. *Equivalence relations for the classical capacity of single-mode Gaussian quantum channels*. E-print arXiv:1303.4939 [quant-ph] (2013). *Phys. Rev. Lett.* **111**:3, 030503-1-030503-5 (2013).
- [3] O. V. Pilyavets, C. Lupo, S. Mancini. *Methods for estimating capacities and rates of Gaussian quantum channels*. E-print arXiv:0907.1532 [quant-ph] (2009-2011). *IEEE Trans. Inf. Theory* **58**:9, 6126-6164 (2012).
- [4] C. Lupo, O. V. Pilyavets, S. Mancini. *Capacities of lossy bosonic channel with correlated noise*. E-print arXiv:0901.4969 [quant-ph] (2009). *New J. Phys.* **11**:6, 063023 18pp (2009).
- [5] O. V. Pilyavets, V. G. Zborovskii, S. Mancini. *Lossy bosonic quantum channel with non-Markovian memory*. E-print arXiv:0802.3397 [quant-ph] (2008). *Phys. Rev. A* **77**:5, 052324-1-052324-8 (2008).

Probability representation of quantum mechanics

- [1] V. N. Chernega, O. V. Man'ko, V. I. Man'ko, O. V. Pilyavets, V. G. Zborovskii. *Tomographic characteristics of spin states*. *J. Russ. Laser Res.* **27**:2, 132-166 (2006).
- [2] O. V. Man'ko, V. I. Man'ko, O. V. Pilyavets. *Probability representation of classical states*. *J. Russ. Laser Res.* **26**:6, 429-444 (2005).
- [3] V. I. Man'ko, O. V. Pilyavets. *Entangled Gaussian states of a two-dimensional nonstationary damped oscillator*. *J. Russ. Laser Res.* **26**:4, 259-272 (2005).

Conference proceedings

- [1] O. V. Pilyavets, E. Karpov, J. Schäfer. *Superadditivity of classical capacity revisited*. In: H.-J. Schmiedmayer and P. Walther (eds.), *Proceedings of 11th International Conference on Quantum Communication, Measurement and Computing (QCMC)* (Vienna, Austria, 30 July – 3 August, 2012), *AIP Conf. Proc.* **1633**, 189-191 (2014).
- [2] E. Karpov, J. Schäfer, O. V. Pilyavets, R. García-Patrón, N. J. Cerf. *Gaussian classical capacity of Gaussian quantum channels*. In: N. F. Morozov and I. Yu. Popov (eds.), *Proceedings of International Conference "Mathematical Challenge of Quantum Transport in Nanosystems – 2013" (Pierre Duclos Workshop)* (St. Petersburg, Russia, 13-15 March, 2013), *Nanosystems: Physics, Chemistry, Mathematics* **4**:4, 496-506 (2013).
- [3] O. V. Pilyavets, V. G. Zborovskii, S. Mancini. *A lossy bosonic quantum channel with non-Markovian memory*. In: A. Lvovsky (ed.), *Proceedings of 9th International Conference on Quantum Communication, Measurement and Computing (QCMC)* (Calgary, Canada, 19-24 August, 2008), *AIP Conf. Proc.* **1110**, 123-126 (2009).

Other publications

- [1] V. I. Man'ko, O. V. Pilyavets, V. G. Zborovskii. *Probability representation of quantum mechanics: comments and bibliography*. E-print arXiv:quant-ph/0608251 (2006).

Talks and posters

Coauthor who presented the work is underlined

- [1] Contributed talk. E. Karpov, J. Schäfer, O. V. Pilyavets, N. J. Cerf, *Optimal environment for quantum bosonic Gaussian channels*. 22nd Central European Workshop on Quantum Optics (CEWQO), Warsaw, Poland. 6–10 July, 2015.
- [2] Contributed talk. J. Schäfer, E. Karpov, O. V. Pilyavets, N. J. Cerf. *Gaussian capacity of the single-mode Gaussian quantum channel*. 21st Central European Workshop on Quantum Optics (CEWQO), Brussels, Belgium. 23–27 June, 2014.
- [3] Poster. O. V. Pilyavets, E. Karpov, J. Schäfer. *The channel environment that makes classical capacity superadditive*. XVII Conference on Quantum Information Processing (QIP), Barcelona, Spain. 3–7 February, 2014.
- [4] Contributed talk. O. V. Pilyavets, E. Karpov, J. Schäfer, *et al.* *Transmission of classical information through Gaussian quantum channels*. Conference “Noise, Information & Complexity @ Quantum Scale” (NIC@QS), Ettore Majorana Centre, Erice (Sicily), Italy. 6–12 October, 2013.
- [5] Poster. O. V. Pilyavets, E. Karpov, V. G. Zborovskii, S. Mancini. *Lossy bosonic quantum channel with fluctuating parameters*. Conference “Noise, Information & Complexity @ Quantum Scale” (NIC@QS), Ettore Majorana Centre, Erice (Sicily), Italy. 6–12 October, 2013.
- [6] Poster. O. V. Pilyavets, E. Karpov, J. Schäfer. *Superadditivity of classical capacity revisited*. 11th International Conference on Quantum Communication, Measurement and Computing (QCMC), Vienna, Austria. 30 July – 3 August, 2012.
- [7] Poster. O. V. Pilyavets, E. Karpov, J. Schäfer. *Superadditivity of classical capacity revisited*. 9th International Workshop “Continuous Variable Quantum Information Processing” (CVQIP), Copenhagen, Denmark. 27–30 April, 2012.
- [8] Invited talk. O. V. Pilyavets, C. Lupo, S. Mancini. *Estimating capacities of Gaussian quantum channels*. Workshop “New Trends in Quantum Dynamics and Quantum Entanglement,” Trieste, Italy. 21–25 February, 2011.
- [9] Poster. O. V. Pilyavets, C. Lupo, S. Mancini. *Classical capacity of a lossy bosonic channel with memory*. Italian Quantum Information Science Conference (IQIS), Camerino, Italy. 24–29 October, 2008.
- [10] Contributed talk. C. Lupo, O. V. Pilyavets, S. Mancini. *Capacities of Gaussian bosonic channel with memory*. Italian Quantum Information Science Conference (IQIS), Camerino, Italy. 24–29 October, 2008.
- [11] Contributed talk. O. V. Pilyavets, V. G. Zborovskii, S. Mancini. *A lossy bosonic quantum channel with non-Markovian memory*. 8th Asian Conference on Quantum Information Science (AQIS), Seoul, Korea. 25–31 August, 2008.

Other attended conferences, workshops, and meetings

- [1] Device-Independent Quantum Information Processing and Quantum Algorithms Joint Meeting (DIQIP & QAlgo), Brussels, Belgium. 13–16 May, 2014.
- [2] Quantum Computer Science, Device-Independent Quantum Information Processing, and Quantum Algorithms Joint Meeting (QCS, DIQIP & QAlgo), Paris, France. 14–17 May, 2013.
- [3] One-day colloquium on Keccak and SHA-3 “Keccak & SHA-3 Day,” Brussels, Belgium. 27 March 2013.
- [4] 10th Workshop on Continuous-Variable Quantum Information Processing (CVQIP), Paris, France. 30 January – 1 February, 2013.
- [5] Conference “Noise, Information & Complexity @ Quantum Scale” (NIC@QS), Ettore Majorana Centre, Erice (Sicily), Italy. 4–10 November, 2007.

Research visits

- [1] Prof. Nicolas Cerf group.
Centre for Quantum Information & Communication.
Université Libre de Bruxelles, Brussels, Belgium.
9 Nov 2009 – 13 Nov 2009.

Current research interests

- [1] Quantum channels with continuous variables
- [2] Influence of correlations and memory on information transmission
- [3] Applications of quantum computer science to cryptography

Teaching

- [1] Information and coding theory. Seminars. Université Libre de Bruxelles, Brussels, Belgium. 2012–2014.

Work experience**Université Libre de Bruxelles**

Brussels, Belgium. *Sep 2011 – Present*

Position: Post-doc in Centre for Quantum Information & Communication (QuIC), Ecole Polytechnique de Bruxelles

Projects: Post-doctoral grant “Ouvertures internationales”
F.R.S.-FNRS (HIPERCOMM)

Focus: Capacities of bosonic Gaussian quantum channels

Group leader: Prof. Nicolas Cerf

University of Camerino

Camerino, Macerata province, Marche region, Italy. *Apr 2010 – Apr 2011*

Position: Post-doc in Quantum Optics & Quantum Information Group of
Physics Department, Faculty of Science and Technology

Research project: Quantum channels characterization

Focus: Influence of noise on classical capacity of lossy bosonic channel

Group leader: Prof. Stefano Mancini

Troitsk Institute for Innovation and Fusion Research

Troitsk, Moscow region, Russia. *Oct 2003 – Jun 2006*

Position: Computer operator

Focus: Optical properties of plane-layered structures

Group leader: Prof. Anatoliy Napartovich