Prof. **IVAN SAVENKO**

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Currently: Tenure Track Junior Research Team Leader (at IBS PCS)

Academic work experience

· **Junior Research Team Leader**, IBS (Daejeon, Republic of Korea), Feb 2016 – till now, Assistant Professor at the UST (University of Science and Technology), Korea
· **DECRA Fellow**, Australian National University (Canberra, Australia) (2016)
· **Postdoctoral Researcher**, Aalto University (Espoo, Finland), Aug 2013 – Jan 2016
· **Research Assistant**, *Nanyang Technological University* (Singapore), May 2012 – May 2013
· **Visiting PhD fellow of *Nordita*** (Stockholm, Sweden), Jan 2012 – Feb 2012
· **Internship**, *International Institute of Physics* (Natal, Brazil), Jan 2011 – Aug 2011
· **PhD Researcher** (Reykjavik, Iceland), Sep 2010 – Jun 2013
· **Software Developer**, *Soft-Impact and STR-Group ltd.*, Feb 2009 – Mar 2010
· **Research fellow**, Physical Technological University of the Russian Academy of Sciences, *Photonic Microstructures* Lab, Jul 2009 – Aug 2010

Education

· University of Iceland, Science Institute, School of Engineering and Natural Sciences
PhD-studentship: **PhD degree**: 18.06.2013
· Academic University – Nanotechnology Research and Education Centre
M.Sc. in Methods and Technology, 30.06.2010 (with honors)
· St. Petersburg State Polytechnical University
B.Sc. in Methods and Technology, 27.06.2008

Personal grants

· "DECRA" - personal grant from the Australian Research Council (2015)
· "PRESIDENT" foundation personal grant (2016)
· "DYNASTY" foundation personal grant (2015).
· "EIMSKIP" foundation personal grant – for scientific research in the framework of the PhD studentship at the University of Iceland in 2012-2013.
· "UMNIK" – personal grant (literally from Russian "Participant of Innovative Competition for Young Scientists") for scientific research devoted to 1) Stripe lasers with features (Mar 2010 – Mar 2011); 2) Terahertz sources and detectors (Apr 2011 – Apr 2013).

Research Team

· M. Sun: *PhD student*, IBS (Feb 2016 – till now)
· D. Ko: joint Master/*PhD student*, IBS (Sep 2017 – till now)
· S. Yoon: *Research Fellow*, IBS (Oct 2016 – till now)
· K. Villegas: *Research Fellow*, IBS (Jun 2017 – till now)

Teaching experience

· Advanced Solid State Physics: Lectures (March-June 2017)
· Quantum mechanics II – second quantization: *problem classes* (Sep 2012 – Dec 2012)
· Quantum mechanics: *problem classes* (Sep 2010 – Dec 2010, Aug 2011 – Dec 2011)
· Continual (path) integral - applications in physics: *lectures* (Sep 2011 – Dec 2011)
· Public talks and making a presentation: *training* (2014)

International research cooperation

· Würzburg University (Würzburg, Germany)
· Nanyang Technological University (Singapore)
· École Polytechnique Federale de Lausanne (Lausanne, Switzerland)
· ITMO University (St.-Petersburg, Russia)
· Institute of Condensed Matter Theory and Solid State Optics (Jena, Germany)
· Aalto University (Espoo, Finland)
· Loughborough University (Loughborough, UK)

Organization of Workshops/Conferences

Internaitonal Workshop "Physics of Exciton-Polaritons in Artificial Lattices" (May 15-19, 2017), Daegeon, South Korea

Selected conferences & schools & trainings participation

Terametanano-3, 2018 (March 22-29 2018, Uxmal, Mexico) ***Invited Talk***
Meta 2017 (Jul 25-28 2017, South Korea) ***Invited Talk***
Asian Network School on Complex Condensed Matter Systems (Nov 19-25 2017, Vietnam) ***Invited Lecture***
PLMCN 18 (Jul 09-14 2017, Germany)
Metanano 2017 (Sep 18-22 2017, Russia) ***Invited Talk***
FNM 2016 (Sep 6-10 2016, Tbilisi, Georgia) ***Invited Talk***
Statphys 26 (Jul 18-22 2016, Leon, France)
QD 2016 (May 23-27 2016, Jeju Island, Korea)
Nonlinear Photonics 2015 (Jun 29-Jul 02 2015, Saint Petersburg, Russia) ***Invited Talk***
Meta 2015 (August 2015, New-York, USA)
Training: Oratory skills 2.0 (March 18, 2014, St.-Petersburg, Russia); + multiple other oratory, presentation, and leadership trainings;
Training: Grant Proposal Writing (January 7-8, 2014, Helsinki, Finland);
OECS 13 (September 8-13, 2013, Rome, Italy);
Nanostructures: Physics and Technology (June 24-28, 2013, St.-Petersburg, Russia);
SRP in MT (September 03-28, 2012, Stockholm, Sweden);

PLMCN-12 (June 19-23, 2012, Hangzhou, China);
NORDITA winter school (Jan 9-20, 2012, Stockholm, Sweden)*;*
NANOMEETING-2011 (May 24-27, 2011, Minsk, Belarus);
PLMCN-11 (April 4-8, 2011, Berlin, Germany);
Physica SPb (October 27-28, 2010, St.-Petersburg, Russia).

Publications

1. M. V. Boev, V. M. Kovalev, I. G. Savenko, Bogolon–mediated electron capture by impurities in hybrid Bose–Fermi systems, **Phys. Rev. B** 97, 165305 (2018).
2. D. V. Karpov, I. G. Savenko, Polariton condensation in photonic crystals with high molecular orientation, **New Journal of Physics** 20, 013037 (2018).
3. M. Klaas, H. Flayac, M. Amthor, I. G. Savenko, S. Brodbeck, T. Ala-Nissila, S. Klembt, C. Schneider, and S. Höfling, Evolution of Temporal Coherence in Confined Exciton-Polariton Condensates, **Phys. Rev. Lett.** 120, 017401 (2018).
4. V.Kovalev, I. G. Savenko, Paramagnetic resonance in spin-polarized disordered Bose-Einstein condensates, **Scientific Reports** 7, 2076 (2017).
5. T. C. H. Liew, H. Flayac, D. Poletti, I. G. Savenko, and F. P. Laussy, Kinetic Monte Carlo approach to nonequilibrium bosonic systems, **Phys. Rev. B** 96, 125423 (2017).
6. M.Sun, I. G. Savenko, H. Flayac, T.C.H. Liew, Multivalley engineering in semiconductor microcavities, **Scientific Reports** 7, 45243 (2017).
7. M.V. Boev, V.M. Kovalev and I. G. Savenko, Magnetoplasmon Fano Resonance in Bose-Fermi Mixtures, **Phys. Rev. B Rapid Communications** 94 241408(R) (2016).
8. D. M. Karpov and I. G. Savenko, Operation of a semiconductor microcavity under electric excitation, **Applied Physics Letters** 109(6), 061110 (2016).
9. K. Winkler, O. Egorov, I. G. Savenko, T. C. H. Liew, X. Ma, S. Muller, M. Kamp, E. A. Ostrovskaya, S. Höfing, and C. Schneider, Collective state transitions of exciton polaritons loaded into a periodic potential, **Phys. Rev. B Rapid Communications** 93 121303(R) (2016).
10. V. M. Kovalev, I. G. Savenko, I. V. Iorsh, Ultrafast exciton–polariton scattering towards the Dirac points, **J. Phys.: Condens. Matter** 28, 105301 (2016).
11. V. P. Kochereshko, M. V. Durnev, L. Besombes, H. Mariette, V. F. Sapega, A.Askitopoulos, I. G. Savenko, et. al., Lasing in Bose-Fermi mixtures, **Scientific Reports** 6, 20091 (2016).
12. D. Karpov, I. G. Savenko, H. Flayac, and N. Rosanov, Dissipative soliton protocols in semiconductor microcavities at finite temperatures, **Phys. Rev. B** 92, 075305 (2015).
13. J. Govenius, Y. Matsuzaki, I. G. Savenko, M. Möttönen, Parity measurement of remote qubits using dispersive coupling and photodetection, **Phys. Rev. A** 92, 042305 (2015).
14. H. Flayac, I. G. Savenko, T. Ala-Nissilä, and M. Möttönen, Quantum treatment of the Bose-Einstein condensation in nonequilibrium systems, accepted to **Phys. Rev. B** 92, 115117 (2015).
15. S. Suomela, J. Salmilehto, I. G. Savenko, T. Ala-Nissilä, and M. Möttönen, Fluctuations of work in nearly adiabatically driven open quantum systems, **Phys. Rev. E** 91, 022126 (2015).
16. J. Fischer, I. G. Savenko, M. D. Fraser, S. Holzinger, S. Brodbeck, M. Kamp, I. A. Shelykh, C. Schneider, and S. Höfling, Spatial Coherence Properties of One Dimensional Exciton-Polariton Condensates, **Phys. Rev. Lett.** 113, 203902 (2014).
17. M. Amthor, J. Fischer, I. G. Savenko, et. al., Exciton-polariton laser diodes, Nanophotonics and Micro/Nano Optics II, Book Series: Proceedings of SPIE 9277 (2014).
18. C. Schneider, J. Fischer, M. Amthor, S. Brodbeck, I. G. Savenko, et. al., Exciton-Polariton Laser in Magnetic Fields, Quantum Sensing and Nanophotonic Devices XI, Book Series: Proceedings of SPIE 8993 (2014).
19. H.Flayac & I.G.Savenko, An exciton-polariton mediated all-optical router, **Appl. Phys. Lett.** 103,

201105 (2013).
20. I.G.Savenko, R.G.Polozkov, I.A.Shelykh, Spin Aharonov-Bohm quantum ring with exchange interaction, **Phys. Rev. B** 88, 195430 (2013).
21. C.Schneider, A.Rahimi-Iman, Na Y.Kim, J.Fisher, I.G.Savenko, et al, An electrically pumped polariton laser, **Nature** 497, 348-352 (2013).
22. A.A.Pervishko, T.C.H.Liew, V.M.Kovalev, I.G.Savenko, I.A.Shelykh, Nonlinear effects in multi-photon polaritonics, **Optics Express** 21 (13), 15183 (2013).
23. N.Yu.Gordeev, O.I.Rumyantsev, I.G.Savenko, et al, Refractive index of laser active region based on InAs/InGaAs quantum dots, accepted to **J. of Nanophotonics** 7, 073087 (2013).
24. I.G.Savenko, T.C.H.Liew, I.A.Shelykh, Stochastic Gross-Pitaevskii equation for the dynamical thermalization of Bose-Einstein condensates, **Phys. Rev. Lett.** 110, 127402 (2013).
25. I.V.Iorsh, V.M.Kovalev, M.A.Kaliteevski and I.G.Savenko, Rashba plasmon polaritons in semiconductor heterostructures, **Appl. Phys. Lett.** 102, 101105 (2013).
26. Ö.Bozat, I.G.Savenko, I.A.Shelykh, Spin multistability in dissipative polariton channels, **Phys. Rev. B** 86, 035413 (2012).
27. I.G.Savenko, O.V.Kibis, and I.A.Shelykh, Asymmetric quantum dot in a microcavity as a nonlinear optical element, **Phys. Rev. A** 85, 053818 (2012).
28. I.G.Savenko, I.V.Iorsh, M.A.Kaliteevski, and I.A.Shelykh, Spatial coherence in one-dimensional polariton channels, **JETP** 116 (1) [RUS: ZEiTF 143 (1)].
29. I.G.Savenko, N.Yu.Gordeev, I.V.Iorsh, M.A.Kaliteevski, M.V.Maximov, and A.E.Zhukov, Spectral selection of spatial modes in edge-emitting lasers, **Phys. Stat. Solidi** C 9 (50) 1292 (2012).
30. I.G.Savenko, R.G.Polozkov, and I.A.Shelykh, Giant Rabi splitting in metallic cluster – cavity system, **J. Phys. B** 45, 045101 (2012).
31. E.B.Magnusson, I.G.Savenko, and I.A.Shelykh, Bistability phenomena in one-dimensional polariton wires, **Phys. Rev. B** 84, 195308 (2011).
32. I.G.Savenko, E.B.Magnusson, I.A.Shelykh, Full density matrix formalism applied to 1D exciton-polariton transport: Proceedings of International Conference NANOMEETING 2011: Physics, Chemistry and Applications of Nanostructures - Reviews and Short Notes 2011.
33. I.G.Savenko, I.A.Shelykh, and M.A.Kaliteevski, Nonlinear terahertz emission in semiconductor microcavities, **Phys. Rev. Lett.** 107, 027401 (2011).
34. I.G.Savenko, E.B.Magnusson, I.A.Shelykh, Density-matrix approach for an interacting polariton system, **Phys. Rev. B** 83, 165316 (2011).

Preprints

35. V. M. Kovalev, A. E. Miroshnichenko, I. G. Savenko, Radiation pressure quantization arXiv:1804.03283 (2018).
36. V. M. Kovalev, W.-K. Tse, M. V. Fistul and I. G. Savenko, Valley Hall transport of photon-dressed quasiparticles in two-dimensional Dirac semiconductors, arXiv:1803.06607 (2018).

Conferences theses and proceedings

37. **PLMCN 17** conference – an oral presentation (March 28-31 2016, Nara, Japan).
38. **Meta Nano 2015** conference – a poster presentation (August 03-08 2015, New York, USA).
39. **Nonlinear Photonics** - **Invited talk** (Saint-Petersburg, 2015).
40. **Nanostructures: Physics and Technology**: an oral and a poster (Saint-Petersburg, 2015).
41. **Days of Diffraction** conference – an oral contribution (Saint-Petersburg, 2015).
42. A. Rahimi-Iman, C. Schneider, Na Y. Kim, J. Fischer, I. G. Savenko, et al., An Electrically Driven

Polariton Laser, Asia Communications and Photonics Conference (2014).

43. I.G.Savenko, T.C.H.Liew & I.A.Shelykh, Theory of energy relaxation in Bose-Einstein Condensates, International Conference on Optics of Excitons in Confined Systems 13 **(OECS 13),** September 2013, Rome, Italy.
44. I.G.Savenko, T.C.H.Liew & I.A.Shelykh, Stochastic Gross-Pitaevskii equation with phonon relaxation, **Nanostructures: Physics and Technology**, June 2013, Saint-Petersburg, Russia.
45. I.G.Savenko, O.V.Kibis & I.A.Shelykh, Asymmetric quantum dot - microcavity coupling, Physics of Light-Matter Coupling in Nanostructures 14 **(PLMCN 14)**, May 2013, Crete.
46. I.G.Savenko, T.C.H.Liew & I.A.Shelykh, Stochastic Gross-Pitaevskii equation with phonon relaxation, **PLMCN 14**, May 2013, Crete, Greece.
47. A. Pervishko, T.C.H.Liew, V.M.Kovalev, I.G.Savenko & I.A.Shelykh, Multi-photon polaritonics, **PLMCN 14** (May 2013, Crete, Greece).
48. I.G.Savenko, R.G.Polozkov & I.A.Shelykh, Metallic cluster like a 0D object in microcavity, Quantum Dots 2012 (**QD-2012)**, May 2012, New Mexico, USA.
49. I.G.Savenko, O.V.Kibis & I.A.Shelykh, Asymmetric quantum dot – microcavity coupling, **QD-2012** (May 2012, New Mexico, USA).
50. I.G.Savenko, M.A.Kaliteevski & I.A.Shelykh, Nonlinear terahertz logical element,**PLMCN-12** , June 2012, Hangzhou, China.
51. I. G. Savenko, I.A. Shelykh, M.A. Kaliteevski, Effects of bistability and hysteresis in terahertz-emitting microcavities, **OECS-12**, September 12-16, 2011, Paris.
52. I. G. Savenko, I.A. Shelykh, R.G. Polozkov, Giant Rabi splitting in metallic clusters, **OECS-12**, September 12-16, 2011, Paris.
53. E.B. Magnusson, I. G. Savenko, I.A. Shelykh, Bistabilities in 1D polaritonic condensates, **OECS-12**, September 12-16, 2011, Paris.
54. I. G. Savenko, E. B. Magnusson, I. A. Shelykh, Full density matrix formalism applied to 1D exciton-polariton transport, **Nanomeeting-2011**, May 24-27, 2011, Minsk.
55. I. G. Savenko, N. Yu. Gordeev, O. I. Rumyantsev, A. S. Payusov, Optical properties of quantum dots in a tilted wave laser, **Nanomeeting-2011** (May 24-27, 2011, Minsk).
56. I. G. Savenko, E. B. Magnusson, I. A. Shelykh, Polaritons dynamics in one-dimensional channel, **PLMCN-11**, April 4-8, 2011, Berlin.
57. M. A. Kaliteevski, K. V. Kavokin, R. A. Abram, A. V. Kavokin, I. G. Savenko, I. A. Shelykh, THz emission and bistability in quantum microcavity, **PLMCN-11**, (April 4-8, 2011, Berlin).
58. I. G. Savenko, N. Yu. Gordeev, M. V. Maximov, Spectral selection of spatial modes in edge-emitting lasers, **PLMCN-11**, (April 4-8, 2011, Berlin).
59. I. G. Savenko, E. B. Magnusson, I. A. Shelykh, Dynamics of one-dimensional polariton condensates, International Conference on spontaneous coherence in Excitonic Systems (**ICSCE-5)**, February 7-11, 2011, Switzerland.
60. I. G. Savenko, I. V. Iorsh, M. A. Kaliteevski, N. Yu. Gordeev, Semiconductor stripe laser mode structure set by means of effective refractive index modulation (in Russian), **Physica SPb**, October 27-28, 2010, St.-Petersburg.
61. N. Yu. Gordeev, I. G. Savenko, et al., New constructions of edge-emitting spatially single-mode lasers, **Semiconductor lasers: physics and technology**, November 10-12, 2010, St.-Petersburg.