CURRICULUM VITAE

Ivan M. Safonov,
PhD Student, Student Member IEEE/LEOS, Student Member SPIE, Student Member OSA

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EDUCATION

2004-present	PhD student of Kharkov National University of Radio Electronics. PhD thesis title is **"Self-consistent analysis for transport processes in MQW structures."**
2003-2004	Kharkov National University of Radio Electronics M.S. Student. Master of Science thesis title is "**Self-consistent analysis of the potential profile of semiconductor multiple quantum well heterostructures.**" Graduated with the highest honors from the Kharkov National University of Radio Electronics as a specialist in the area of lasers and optoelectronic engineering.
1999-2003	Student at the Electronics Faculty in the Kharkov National University of Radio Electronics, Kharkov, Ukraine. Graduated with the highest honors from the Kharkov National University of Radio Electronics as a bachelor in the area of lasers and optoelectronic engineering.

PhD THESIS

Title: "Self-consistent analysis for transport processes in MQW structures"

MASTER OF SCIENCE THESIS

Title: "Self-consistent analysis of the potential profile of semiconductor multiple quantum well heterostructures"
- Models for multiple asymmetric quantum well heterostructures;
- Mathematical methods for self-consistent analysis.

PROFESSIONAL ACTIVITY:

Theory of quantum well structures; dynamical behavior of semiconductor lasers; modeling and optimization of the laser and amplifier structures including asymmetrical multiple quantum wells; educational software tools creation.

GRANTS AND SCHOLARSHIPS

Scholarship named after prof. Novikov(2002-2004)
Grant of the IEEE Lasers and Electro-Optics Society Student Project Program 2002
Grant of the IEEE/LEOS Chapter Ukraine for the conf. CADSM'2003, 18-22 Feb. 2003, Slavske, Ukraine
Scholarship from the Parliament of Ukraine (2004-2005)
Grant of the IEEE/LEOS Chapter Ukraine for the conf. CAOL'2003, 16-20 Sep. 2003, Alushta, Ukraine
"Young scientist support" from the Org. Committee of the Symposium ISSSE'04, 10-13 Aug. 2004, Linz, Austria
Grant of the IEEE/LEOS Chapter Ukraine for the conf. QE-2004 22-25 Nov.2004, Minsk, Belarus
Grant of the EPS for the conf. CLEO/Europe-EQEC 2005, 12-17 June 2005, Munich, Germany
Grant of the Jyväskylä Summer School, 19-26 August 2005, Finland
Grant of SPIE for participation in Photonics Europe Symposium, 3-7 April, 2006, Strasbourg, France
One-year scholarship from DAAD (Deutsche Akademischer Austausch Dienst) for research in Ulm University (2006-2007).

MEMBERSHIP

IEEE - The Institute of Electrical and Electronic Engineers, *Student member*
LEOS – Laser and Electro-Optical Society, *Student member*
SPIE – The International Society for Optical Engineering, *Student member*
OSA – Optical Society of America, *Student member*
Member of the academic council of Kharkov National University of Radio Electronics (2003-2004)
Team-member of the Student Project 2002-2003 "**Interactive teaching software suite for the basic photonics components studying**"
Staff Member of the Joint Organizing Committee IEEE-LEOS International Conference on Advanced Optoelectronics and Lasers, CAOL (Alushta, Crimea, Ukraine, 2003)
Member of the Organizing Committee of 2nd International Conference on Advanced Optoelectronics and Lasers, CAOL / 7th International Conference on Laser and Fiber-Optical Networks Modeling, LFNM / 2nd International Conference on Precision Oscillations in Electronics & Optics, POEO (Yalta, Crimea, Ukraine, 2005)
Member of the Organizing Committee 8th International Conference on Laser and Fiber-Optical Networks Modeling, LFNM (Kharkov, Ukraine, 2006)
Secretary of the section "Laser and optoelectronic engineering. Photonics" of the 10th International Forum "Radio electronics and youth in the XXI century", (Kharkov, Ukraine, 2006)
Moderator of physical, mechanical and chemical chapters of the forum of the library at Mechanical-mathematical faculty of Moscow State University (MSU) (http://lib.mexmat.ru/forum)

AWARDS

The first premium from the Fund of Social Defence for the best diploma work among students of the faculty of Electronic Engineering, 2004
Awarded by a premium as the best speaker at conference CADSM'2003 with a work "Novel Cross-Platform Laser Simulator for Quantum Well Lasers Investigation"
Winner of the University competitions in field of **Physics** in 2001
Winner of the University competitions in field of **Engineering and Computer graphics** in 2000
A lot of school-year winner-diplomas in fields of **Physics, Radio Electronics Designing, Mathematics, Chemistry, Biology, Geography, Ballroom Dances** on district, region, state and world levels in 1996-1999.

COMPUTER SCILLS

Programming:
– MatLAB/FemLAB;
– Java;
– FoxPro;
– Pascal;
– C/C++ (average level).
Other:
– Microsoft Office (Word, Excel, PowerPoint);
– CorelDraw;
– MathCAD.

PUBLICATIONS

Complete publication list includes 40**+1** scientific papers, among them:
10 papers in journals (+1 submitted);
30 conference publications.
Full list of publications can be found below.

LANGUAGES

Russian(native), Ukrainian(native), English(B2), German(A2)

PERSONAL

Date of birth: 31 May 1982, not married, good health.

LIST OF PUBLICATIONS

Journal Publications

1. A. V. Shulika, P. S. Ivanov, I. M. Safonov, A. V. Dyogtyev, V. V. Lysak, A. V. Kublik, and I. A. Sukhoivanov, „LaserCAD III – towards comprehensive simulation of quantum well lasers," International scientific and technical journal "*Optoelectronic information-power technologies*," №1(3), 2002, pp. 125-130. (in Russian)
2. I. N. Keleberda, A. V. Shulika, V. V. Sokol, I. M. Safonov, T. S. Sakalo, P. S. Ivanov, I. A. Sukhoivanov, and N. S. Lesna, "Web-oriented interactive environment for distance education in study of semiconductor lasers," XII IEEE-SPIE Symposium on Photonics and Web Engineering, Wilga, Poland, 21-25 May 2003. *Proceedings of SPIE*, vol. 5484 Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments II. Editor: Ryszard S. Romaniuk. pp. 561-567.
   ISSN 0277-786X; ISBN 0-8194-5415-X,
3. I.M. Safonov, A. V. Shulika, and I. A. Sukhoivanov, "Model for self-consistent analysis of arbitrary MQW structures," *Proc. of SPIE*, Optics East Symposium, conference on Physics and Applications of Optoelectronic Devices, 25-28 October, 2004, Philadelphia, Pennsylvania, USA, SPIE Code Number 5594-18, pp. 33-44.
4. O.V. Shulika, I.M. Safonov, I.A. Sukhoivanov, and V.V. Lysak, "Quantum capture area in layered quantum well structures," *Microelectronics Journal* (Elsevier Pub.), vol. 36, 2005, pp. 350–355.
5. M.V. Klimenko, A.V. Shulika, and I.M. Safonov, I.A. Sukhoivanov "Gain spectra calculation for semiconductor single quantum well structure," *Radioelectronica i informatica*, No. 3(2005), pp. 43-46. (in Russian)
6. M.V. Klimenko, A.V. Shulika, I.M. Safonov, and I.A. Sukhoivanov, "Influence of the axial approximation on the density of states of quantum well structures," *Radiotekhnika*, vol. 143, pp.101-106 (2005). (in Russian)
7. I.M. Safonov, M.V. Klymenko, and I.A. Sukhoivanov, "Enhancement of electron capture efficiency in MQW structures", *Proc of SPIE*, vol. 6184, 2006, p.476-483.
8. V.V. Lysak, I.A. Sukhoivanov, O.V. Shulika, I.M. Safonov, and Y.T. Lee, "Carrier Tunneling in Complex asymmetrical multiple quantum well semiconductor optical amplifiers," *Phot. Technol. Lett.*, vol. 18, pp. 1362–1364 (2006).
9. I.M. Safonov, O.V. Shulika, I.A. Sukoivanov, and S.I. Petrov, "Numerical Model for Investigation of Modulation Properties of Semiconductor Lasers," submitted to *International Journal of Numerical Analysis & Modeling*
10. I.M. Safonov, O.V. Shulika, I.A. Sukhoivanov, and J.A. Andrade-Lucio, "Continuous-band heterostructures: novel concept for development of low-loss distributed Bragg reflectors for optoelectronic devices," Journal of Optoelectronics and Advanced materials – Rapid Communications, Vol. 1 No. 3, p. 96-99 (2007).
11. I.M. Safonov, O.V. Shulika, I.A. Sukhoivanov, and J.A. Andrade-Lucio, "Continuous-band heterostructures: new concept for development of low-loss distributed Bragg reflectors for optoelectronic devices," Journal of Optoelectronics and Advanced materials, vol. 9, no. 8, pp. 2404 – 2407 (2007).

Conference Proceedings

2001

1. I. Safonov and A. Prigoda, “Comparative analysis of the Runge-Kutta modifications for the ordinary first-order differential equations solving,” *Proc. of the 5th International Forum “Radio electronics and youth in the XXI century”*, Kharkov, Ukraine, 2001, pp. 162-163. (in Russian)

2002

2. A. V. Dyogtyev and I.M. Safonov, „Design of physical analysis modules for the package LaserCAD III,” *Proc. of the 6th International Forum “Radio electronics and youth in the XXI century,”* Kharkov, Ukraine, 2002, p. 168. (in Russian)

2003

3. I. M. Safonov and A. V. Shulika, „Calculation of fundamental physical parameters for multiple component semiconductor alloys,” *Proc. of the 7th International Forum “Radio electronics and youth in the XXI century,”* Kharkov, Ukraine, 2003, p. 168. (in Russian)
4. V. Shulika, P. S. Ivanov, I. M. Safonov, A. V. Kublik, and I. A. Sukhoivanov “Novel cross-platform laser simulator for quantum well lasers investigation,” *Proc. of The Experience of Designing and Application of CAD Systems in Microelectronics Conference*, CADSM’03, Slavske, Ukraine, 18-22 February, 2003, pp. 175-178.
5. A. V. Shulika, I. M. Safonov, P. S. Ivanov, and I. A. Sukhoivanov, “Advanced versatile software tool for comprehensive studying of quantum-well semiconductor lasers”, *Proc. of 10th International Conference Mixed Design of Integrated Circuits and Systems*, MIXDES’03, Lodz, Poland, 2003, pp. 661-664.
6. A. V. Shulika, I. M. Safonov, P. S. Ivanov, I. A. Sukhoivanov, and V. V. Lysak, “LaserCAD III – web-oriented software tool for distance learning in study of semiconductor structure properties,” *Proc. of IEEE/LEOS International Conference on Numerical Simulation of Semiconductor Optoelectronic Devices*, NUSOD’03, October 13-16, 2003, Komaba Campus, the University of Tokyo, Tokyo, Japan, pp. 55 –56.
7. A. V. Shulika, I. M. Safonov, P. S. Ivanov, V. V. Lysak, I. A. Sukhoivanov, and N. S. Lesna, “Comprehensive simulation of MQW semiconductor lasers by using LaserCAD III,” *Proc. International Workshop on Laser and Fiber-Optical Networks Modeling*, LFNM’03, 19-20 September, 2003, Alushta, Crimea, Ukraine, pp. 80-83.
8. Ya. Kuzemin, N. D. Minajlo, I. M. Safonov, and A. V. Shulika, “Using Java in engineering and scientific computations and in designing systems,” *Proc. of International Workshop on Laser and Fiber-Optical Networks Modeling*, LFNM’03, 19-20 September, 2003, Alushta, Crimea, Ukraine, pp. 93-94.
9. V. V. Sokol, S. D. Makovetsky, I. M. Safonov, A. V. Shulika, N. S. Lesna, and I. A. Sukhoivanov, “Enlargement of functionality of distance learning course on example of LaserCAD III software application ”, *Proc. of International scientific and practical conference “Unified information space”*, Dnepropetrovsk, Ukraine, December 3-4, 2003, pp. 51-54. (in Russian)

2004

10. I. Safonov, A. Shulika, I. Sukhoivanov, A. Kublik, and P. Ivanov, “Novel Method for Computation of Frequency Characteristics of Semiconductor Lasers,” *Proc. of International Symposium on Signals, Systems, and Electronics*, ISSSE’04, August 10-13, 2004, Johannes Kepler University of

Linz, Austria. Electronic publication, ISBN 3-9501491-3-9.
11. I. M. Safonov, A. V. Shulika, and I. A. Sukhoivanov, "Applicability of the piecewise-linear approximation of the potential profile of undoped MQW heterostructures," *Proc. of 5th International Scientific and Technical Conference Quantum Electronics*, QE-2004, 22–25 November, 2004, Minsk, Belarus, p. 108.
12. A. V. Shulika, I M. Safonov, and I A. Sukhoivanov, "Quantum Capture Area in Layered Quantum Well Structures," *Proc of the 5th International Conference on Low Dimensional Structures and Devices*, LDSD'2004, Cancun, Mayan Riviera, Mexico, 12-17 September 2004, Book of abstracts, Abstract Tu-P85, p. 141.
13. I.M. Safonov, S.I. Petrov, A.A. Ovezgeldiev, and S.V. Grishchenko "LaserCAD – novel educational CAD for semiconductor quantum well lasers studying," *Proc. of the Conference on Education and Virtual Reality 2004*, Kharkov-Yalta, Ukraine, pp. 369-373.

2005

14. I.M. Safonov, M.V. Klimenko, and I.A. Sukhoivanov, "Modification of Confinement Area for Efficient Electrons Capture in MQW SCH," *Conference digest for CLEO/Europe 2005 - EQEC 2005*, Europhysics Conference Abstracts vol. 29B, paper EA-539.
15. I.M. Safonov, O.V. Shulika, and I.A. Sukhoivanov, "Comprehensive modification of AMQW-SCH for efficient electrons capture," *Proc. of the 7th International Conference on Laser and Fiber-Optical Networks Modeling*, LFNM'05, September 15-17, 2005, Yalta, Crimea, Ukraine, pp. 16-22.
16. M.V. Klimenko, O.V. Shulika, and I.M. Safonov, "Band structure computation of asymmetric multiple quantum well," *Proc. of the 7th International Conference on Laser and Fiber-Optical Networks Modeling*, LFNM'05, September 15-17, 2005, Yalta, Crimea, Ukraine, pp. 64-67.
17. M.V. Klimenko, I.M. Safonov, O.V. Shulika, and I.A. Sukhoivanov, "Anisotropy of the valence subbands in quantum well structures: effect on density of states characteristics," *Proc. of the 5th International Conference on Numerical Simulation of Optoelectronic Devices*, NUSOD'05, 19-22 September, 2005, Berlin, Germany, pp. 73-74.

2006

18. I.M. Safonov, M.V. Klymenko, and I.A. Sukhoivanov, "Enhancement of electron capture efficiency in MQW structures," Technical Abstract Summary Digestof Photonics Europe Symposium 2006, Conference 6184: Semiconductor Lasers and Laser Dynamics II, paper 6184-57.
19. I.M. Safonov, I.A. Sukhoivanov, O.V. Shulika, A.A. Dyomin, S.O. Yakushev, M.V. Klymenko, S.I. Petrov, and V.V. Lysak, "Continuous Band Heterostructures: A New Concept for Development of Low-loss Distributed Bragg Reflectors for Optoelectronic Devices", Proc of 8th International Conference on Transparent Optical Networks, ICTON'2006, paper We.C2.2, vol.2, pp. 193-198.
20. M.V. Klymenko, O.V. Shulika, I.M. Safonov, and I.A. Sukhoivanov, "Revelation of couples of semiconductor materials without the band offsets and with the differing electron effective masses," *Proc. of Conference on Laser and Fiber-Optical Networks Modeling*, LFNM'06, June 29 –July 1, 2006, Kharkov, Ukraine, pp. 414-417.
21. M.V. Klymenko, I.M. Safonov, O.V. Shulika, and I.A. Sukhoivanov, "Band structure of the effective-mass superlattice," *Proc. of Conference on Laser and Fiber-Optical Networks Modeling*, LFNM'06, June 29 –July 1, 2006, Kharkov, Ukraine, pp. 411-414.
22. I.M.Safonov, M.V. Klymenko, O.V. Shulika, and I.A. Sukhoivanov, "Ternary/quaternary continuous- band heterostructures," *Proc. of Conference on Laser and Fiber-Optical Networks*

Modeling, LFNM'06, June 29 –July 1, 2006, Kharkov, Ukraine, pp. 399-402.

23. I. M. Safonov, I. A. Sukhoivanov, J. Kratz, S. I. Petrov, M. V. Klimenko, O. V. Shulika, "Novel Approach for Design of Low-loss DBRs for VCSELs," in *Frontiers in Optics, Laser Science, Optical Fabrication and Testing and Organic Photonics and Electronics 2006* (Optical Society of America, Washington, DC, 2006), presentation number FThH4. (1 page)
24. M.V. Klymenko, I.M. Safonov, A.V. Shulika, and I.A. Sukhoivanov, "LaserCAD III simulator," *Proc. of 7-th International Young Scientists Conference Optics and High Technology Material Science* SPO 2006, p.105.
25. M.V. Klymenko, I.M. Safonov, A.V. Shulika, and I.A. Sukhoivanov, "Effective-mass superlattice," *Proc. of 7-th International Young Scientists Conference Optics and High Technology Material Science* SPO 2006, p.16.

2007

26. S.I. Petrov, M. F. Bondarenko, I. A. Sukhoivanov, I. M. Safonov, M.V. Klymenko, and O.V. Shulika, Continuous Band Heterostructures: Optical Properties and Carrier Transport, *Proc. of Conference on Low Dimensional Structures and Devices 2007* (LDSD'2007), Caribbean Archipelago of San Andres, Colombia, April 15 - 20, 2007.
27. M.V. Klymenko, I.M. Safonov, O.V. Shulika, I.A. Sukhoivanov, R. Michalzik, „Effective-mass superlattice as an injector in quantum cascade lasers," *Tech. digest of the PHASE international workshop „PHysics and Applications of SEmiconductor LASERs,"* March 28-30, 2007, Supeléc, Campus de Metz, France, p.31.
28. M.V. Klymenko, I.M. Safonov, O.V. Shulika, and I.A. Sukhoivanov, "Impact of position-dependent effective mass on injector transmittivity in the quantum-cascade laser," *Proc. of Workshop on Optoelectronic Physics and Technology (OPT'2007)*, pp. 7-8 (2007).
29. M.V. Klymenko, I.M. Safonov, I.A. Sukhoivanov, and Michalzik R. "Effective-mass superlattice as a ballistic transport element," *Proc. of Workshop on Optoelectronic Physics and Technology* (OPT'2007), pp. 7-8 (2007).
30. M.V. Klymenko, I.M. Safonov, O.V. Shulika, "Education and simulation with LaserCAD III," *Proc. of Workshop on Optoelectronic Physics and Technology* (OPT'2007), pp. 32-33 (2007).