

# Curriculum Vitae

## Igor Burmistrov

### AFFILIATION AND OFFICIAL ADDRESS

L. D. Landau Institute for Theoretical Physics RAS  
 142432, Russia, Moscow region, Noginsky district  
 Chernogolovka, acad. Semenov prosp., 1a  
 tel.: +007 495 7029317  
 fax: +007 495 7029317  
 e-mail: burmi@itp.ac.ru  
 URL: <http://burmi.itp.ac.ru>

### PERSONAL INFORMATION

Name: Igor Sergeevich Burmistrov  
 Date of Birth: 1 February, 1979  
 Place of Birth: Moscow (USSR)  
 Sex: Male  
 Marital status: married, 2 daughters  
 Citizenship: Russian Federation  
 Language: English (fluent), Russian (native speaker)

### RESEARCH INTERESTS

Low-D disordered strongly-correlated electron systems  
 Topological insulators  
 Anderson-Mott transitions  
 Integer and fractional quantum Hall effects  
 Coulomb blockade in low-dimensional structures  
 Non-equilibrium phenomena in disordered electron systems

### EMPLOYMENT

06/04 - 06/06 Post-doctoral researcher, L.D. Landau Institute for Theoretical Physics  
 09/05 - 12/10 Assistant, Department of Theoretical Physics, Moscow Institute of Physics and Technology  
 06/06 - 12/06 Junior researcher, L.D. Landau Institute for Theoretical Physics  
 12/06 - 07/12 Researcher, L.D. Landau Institute for Theoretical Physics  
 07/12 - present Senior researcher, L.D. Landau Institute for Theoretical Physics

### EDUCATION

09/95 - 06/01 Moscow Institute of Physics and Technology  
 B.A. in physics (cum laude)  
 Bachelor thesis: *Attenuation of an optical wave propagating in a waveguide, formed by layers of a semiconductor heterostructure, owing to scattering on inhomogeneities*  
 Supervisor: Prof. Dr. A.P. Bogatov (Lebedev Physical Institute, Russia)  
 09/99 - 06/01 Moscow Institute of Physics and Technology  
 Master degree (cum laude) in Physics and Mathematics  
 Master thesis: *Metal-insulator transition near two dimensions*  
 Supervisor: Dr. M.A. Baranov (RRC Kurchatov Institute, Russia)  
 09/01 - 06/04 Ph.D. student in L.D. Landau Institute for Theoretical Physics  
 Ph.D. degree in Physics and Mathematics  
 Ph.D. thesis (in Russian): *Interacting two-dimensional electrons in a random potential*

*on high Landau levels*

Supervisors: Dr. M.A. Baranov (RRC Kurchatov Institute, Russia)

Prof. Dr. M.V. Feigelman (Landau Institute, Russia )

11/02 - 05/06 Ph.D. student in Institute for Theoretical Physics at the University of Amsterdam

Ph.D. degree in Physics (cum laude)

PhD thesis:  *$\theta$  renormalization, super universality and electron-electron interactions in the theory of the quantum Hall effect*

Supervisor: Prof. Dr. A.M.M. Pruisken (ITFA, Univ. van Amsterdam)

28/06/12 Habilitation in Theoretical Physics (Doctor of Sciences degree)

L.D. Landau Institute for Theoretical Physics

Thesis (in Russian): *Transport in low-dimensional electron systems and nanostructures: the effect of electron-electron interaction*

#### AWARDS AND PERSONAL GRANTS

09/99 - 09/00 Scholarship of the President of Russian Federation for undergraduates

01/02 - 12/04 Landau Scholarship from Forschungszentrum Juelich for Ph.D. students

01/04 - 12/04 Dynasty Foundation Scholarship for Ph.D. students

01/05 - 12/06 Russian Science Support Foundation Scholarship for young scientists

09/05 - 12/06 Grant of the President of Russian Federation for young scientists

2005 Laureate of the Academia Europaea competition for young Russian scientists

09/07 - 12/08 Grant of the President of Russian Federation for young scientists

01/07 - 12/09 CRDF BRHE Award

01/07 - 12/09 Dynasty Foundation Scholarship for young scientists

01/09 - 12/11 Grant of the President of Russian Federation for young scientists

01/12 - 12/13 Grant of the President of Russian Federation for young scientists

01/13 - 12/15 Dynasty Foundation Scholarship for senior scientists

01/13 - 12/14 Grant of the President of Russian Federation for young scientists

#### PARTICIPATION IN GRANTS

01/99 - 12/01 INTAS Grant #99-1070, researcher

01/02 - 12/04 RFBR Grant #03-02-168-64a, *Strongly correlated spatially inhomogeneous gases*, researcher

01/02 - 12/04 RFBR Grant #03-02-16677, *Interaction of superconductivity and ferromagnetism in mesoscopic hybrid structures*, researcher

01/06 - 12/06 RFBR Grant #06-02-17519-a, *Quantum transport in arrays of long superconducting junctions*, researcher

01/06 - 12/08 RFBR Grant #06-02-16708-a, *Metal-insulator transition in strongly correlated two-dimensional electron system*, researcher

01/07 - 12/09 RFBR Grant #07-02-00998-a, *Spin-transport in mesoscopic superconducting junctions* researcher

02/09 - 02/11 RFBR Grant #09-02-92474-MHKC-a, *Electrons in zero-dimensional systems: the interplay of charge, spin, and non-equilibrium*, **Co-principal investigator**

01/09 - 12/11 RFBR Grant #09-02-00247-a, *Quantum ground states of strongly interacting electrons in 2D systems*, researcher

01/09 - 12/10 RFBR Grant #09-02-12206, *Coherent and non-coherent quantum dynamics of strongly-correlated electrons in nanostructures, low-dimensional and anisotropic materials*, researcher

09/09 - 12/10 Grant of the President of Russian Federation for young scientists, *Equilibrium and non-equilibrium transport in single-electron devices*, **Principal investigator**

05/10 - 11/12 Russian Ministry of Education and Science, contract #P926, *Quantum transport in nanostructures: the interplay of charge, spin, and non-equilibrium*, **Principal investigator**

01/11 - 12/12 RFBR Grant #11-02-12126 *Quantum low-temperature physics of strongly correlated electrons in nanostructures, low-dimensional and layered materials*, researcher

01/11 - 12/12 RFBR Grant #11-02-92470, *Equilibrium and non-equilibrium phenomena in strongly correlated electrons in quantum dots*, **Co-principal Investigator**

01/11 - 12/12 Grant of the President of Russian Federation for young scientists, *Transport in low-dimensional electron systems and nanostructures: The role of electron-electron interaction*, **Principal investigator**

- 09/12 - 12/13 Russian Ministry of Education and Science, contract #8385  
*Quantum coherence and quantum transport in low dimensional electron systems and nanostructures*, RESEARCHER
- 09/12 - 12/13 Russian Ministry of Education and Science, contract #8678  
*Quantum transport and electron states in mesoscopic nanostructures*, RESEARCHER
- 01/12 - 12/14 RFBR Grant #12-02-00579,  
*Quantum ground states of strongly correlated electrons in two- and one-dimensional systems*, RESEARCHER
- 01/14 - 12/16 RFBR Grant #14-02-00333,  
*Multifractality of electron states in low-dimensional disordered electron systems with Coulomb interaction*, PRINCIPAL INVESTIGATOR

#### PROFESSIONAL EXPERTISE

I am a referee for Physical Review Letters, Physical Review B, Europhysics Letters, Journal of Physics A: Mathematical and Theoretical, Journal of Physics: Condensed Matter, Journal of Physics D: Applied Physics, New Journal of Physics, Nanotechnology, Superconductor Science and Technology, Journal of Experimental and Theoretical Physics Letters, Journal of Experimental and Theoretical Physics.

From 2009 till 2011 I was an expert of the “RUSNANO” corporation.

Since 04/12 I am a member of the Editorial Board of the Journal of Experimental and Theoretical Physics.

#### Publications

More than 50 papers are published in referred journals and proceedings. Ten most important papers are listed below.

1. M. A. Baranov, I. S. Burmistrov, and A. M. M. Pruisken  
*Non-Fermi-liquid theory for disordered metals near two dimensions*  
 Phys. Rev. B **66**, 075317 (2002).
2. A. M. M. Pruisken and I. S. Burmistrov  
 *$\theta$  renormalization, electron-electron interactions and super universality in the quantum Hall regime*  
 Ann. of Phys. (N.Y.) **322**, 1265 (2007)
3. I. S. Burmistrov and A. M. M. Pruisken  
*Coulomb blockade and super universality of the theta-angle*  
 Phys. Rev. Lett. **101**, 056801 (2008)
4. Ya. I. Rodionov, I. S. Burmistrov, A. S. Ioselevich  
*Charge relaxation resistance in the Coulomb blockade problem*  
 Phys. Rev. B **80**, 035332 (2009)
5. I.S. Burmistrov, S. Bera, F. Evers, I.V. Gornyi, and A.D. Mirlin,  
*Wave function multifractality and dephasing at metal-insulator and quantum Hall transitions*,  
 Annals of Physics (N.Y) **326**, 1457 (2011).
6. I.S. Burmistrov, I.V. Gornyi, and K.S. Tikhonov,  
*Disordered electron liquid in double quantum well heterostructures: Renormalization group analysis and dephasing rate*,  
 Phys. Rev. B **84**, 075338 (2011).
7. I.S. Burmistrov, I.V. Gornyi, A.D. Mirlin,  
*Enhancement of the critical temperature of superconductors by Anderson localization*,  
 Phys. Rev. Lett. **108**, 017002 (2012).
8. I.S. Burmistrov, Y. Gefen, M.N. Kiselev,  
*An exact solution for spin and charge correlations in quantum dots: The effect of level fluctuations and Zeeman splitting*,  
 Phys. Rev. B **85**, 155331 (2012).

9. I.S. Burmistrov, I.V. Gornyi, A.D. Mirlin,  
*Multifractality at Anderson transitions with Coulomb interaction*,  
Phys. Rev. Lett. 111, 066601 (2013).
10. D.S. Lyubshin, A.U. Sharafutdinov, I.S. Burmistrov,  
*Statistics of spin fluctuations in quantum dots with Ising exchange*,  
Phys. Rev. B 89, 201304(R) (2014)

### Invited Talks

More than 40 invited talks. Ten most important talks are listed below.

1. Symposium on Theoretical and Mathematical Physics (Saint-Peterburg, Russia, July, 2007)  
*Coloumb blockade in a single electron transistor (circular brane model) and superuniversality of the  $\theta$ -angle*
2. L.D.Landau Memorial Conference "Advances in Theoretical Physics" (Chernogolovka, Russia, June, 2008)  
*The Problem of True Macroscopic Charge Quantization in Coulomb Blockade*
3. ARW "Fundamentals of electronic nanosystems" (Saint-Peterburg, Russia, July, 2008)  
*Energy relaxation in the spin-polarized disordered electron liquid*
4. Russian 35th conference on Low Temperature Physics (Chernogolovka, Russia, September, 2009)  
*Electronic properties in a two-dimensional disordered electron liquid: Spin-valley interplay*
5. XVIII Ural winter school on semiconductor physics (Ekaterinburg, February, 2010)  
*Metal-insulator transition in a two-dimensional disordered electron liquid: Spin-valley interplay*
6. ARW "Fundamentals of electronic nanosystems" (Saint-Peterburg, Russia, July, 2010)  
*Spin and Charge correlations in Quantum Dots: An Exact Solution*
7. Ginzburg Conference on Physics (Moscow, Russia, June, 2012)  
*Enhancement of superconductivity by Anderson localization*
8. Symposium on Theoretical and Mathematical Physics (Saint-Peterburg, Russia, July, 2013)  
*Multifractality at Anderson transitions with Coulomb interaction*
9. Moscow International Symposium on Magnetism (Moscow, Russia, July, 2014)  
*Interaction and disorder effects in 3D topological insulator thin films*
10. Conference on Recent Progress and Perspectives in Scaling, Multifractality, Interactions, and Topological Effects near Anderson Transitions, (MPIPKS, Dresden, Germany, Russia, March, 2014)  
*Multifractality at Anderson transitions with Coulomb interaction*

### Conference organization

1. *The Science of Nanostructures: New Frontiers in the Physics of Quantum Dots*  
Chernogolovka, September 20-24, 2010  
<http://qd2010.itp.ac.ru>  
Co-organizer
2. *International conference in honor of G.M. Eliashberg and V.F Gantmakher*  
*"Frontiers in Condensed Matter Physics"*  
October 8-10, 2010 Chernogolovka  
<http://eliashberg80.itp.ac.ru> a member of organizing committee
3. *Russian school for young scientists on nanophysics and nanoelectronics*  
Chernogolovka, June 12-19, 2012  
<http://school12.itp.ac.ru>  
a member of local organizing committee
4. ARW "MESO-2012" *Non-equilibrium and coherent phenomena at nanoscale*  
Chernogolovka, June 17-23, 2012  
<http://meso12.itp.ac.ru>  
a member of local organizing committee

5. *The Science of Nanostructures: New Frontiers in the Physics of Quantum Dots*  
 Chernogolovka, September 10-14, 2012  
<http://qd2012.itp.ac.ru>  
 Co-organizer

## Students and Post-Docs

### Current

- VLADISLAV KURILOVICH, 07/2016 - 07/2018, undergraduate
- PAVEL KURILOVICH, 07/2016 - 07/2018, undergraduate
- EUGENII REPIN, 07/13 - 07/16,  
 Bachelor thesis: *Landau levels of surface states for topological insulators: the effect of trigonal warping and finite mass*

### Former

- EUGENII REPIN, 07/13 - 07/16, bachelor and master  
 Bachelor thesis: *Landau levels of surface states for topological insulators: the effect of trigonal warping and finite mass*  
 Master thesis: *Mesoscopic fluctuations of single particle Green's function near Anderson transition with Coulomb interaction*
- AZAT SHARAFUTDINOV 07/09 - 12/15, bachelor, master and PhD student  
 Bachelor thesis: *Co-tunneling current through a two-level quantum dots with exchange*  
 Master thesis: *Spin susceptibility of quantum dot with anisotropic exchange interaction*  
 PhD thesis: *Spin correlations in quantum dots and nanoparticles*
- NIKITA GUK 04/12 - 12/12, master student  
 Master thesis: *Optical conductivity of graphene: the role of Coulomb interaction*
- YAROSLAV RODIONOV 09/08 - 12/10, PhD student  
 PhD thesis: *Equilibrium and non-equilibrium transport in single-electron devices*  
 current position: researcher, Institute for Theoretical and Applied Electromagnetics RAS