

# Vadym Korotyeyev

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## Curriculum Vitae

### Personal Information

Date of Birth Aug 26, 1977  
Marital Status Married, One Son  
Nationality Ukrainian

### Education

1999 M.S. in Physics, Volyn State University, Lutsk, Ukraine, Physical Faculty.  
2006 Ph. D., in Solid State Physics:, Institute of Semiconductor Physics NASU Kyiv, Ukraine, Department of Theoretical Physics.  
certificate: ДК 034008

### Professional Experience

1994 -1999 student, Volyn State University, Lutsk, Ukraine, Physical Faculty.  
1999 - 2000 School teacher, Secondary School No 16, Lutsk.  
2000-2003 Postgraduate student, Institute of Semiconductor Physics, NAS of Ukraine, Kyiv, Department of Theoretical Physics.  
2003-2007 Junior Research Associate , Institute of Semiconductor Physics, NAS of Ukraine, Kyiv, Department of Theoretical Physics.  
2007-2010 Research Associate , Institute of Semiconductor Physics, NAS of Ukraine, Kyiv, Department of Theoretical Physics.  
Since 2010-present Senior Research Associate , Institute of Semiconductor Physics, NAS of Ukraine, Kyiv, Department of Theoretical Physics.  
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### Computer skills

OS Windows, DOS  
Scientific software Maple, OriginLab, Gnuplot,  $\LaTeX$ , Office, CorelDRAW  
Programming Fortran (including multithreaded calculations), Maple

### Languages

Ukrainian Native  
Russian Native

English Advanced

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## Fields of interest

- Main fields Theoretical Physics, Condensed Matter Theory
- Other fields Applied Physics, Physics of Semiconductors and Semiconductor Devices, Kinetic theory, Plasmonics and THz-electronics
- Current fields High-Field and High-frequency Electron Transport in Low-Dimensional Systems and Nanoscale Devices, Monte-Carlo simulation, generation and detection of THz radiation

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## Previous Travel Experience

- 2004 Spring College on Science at the Nanoscale 2004, The Abdus Salam International Centre for Theoretical Physics (ICTP), Miramare, Trieste, Italy.
- 2006 College on Physics of Nano-Devices , The Abdus Salam International Centre for Theoretical Physics (ICTP), Miramare, Trieste, Italy.
- Aug 2008 ICTP Confernce Graphene Week 2008, The Abdus Salam International Centre for Theoretical Physics (ICTP), Miramare, Trieste, Italy.
- Jul 2009 Summer College on Nonequilibrium Physics from Classical to Quantum Low Dimensional Systems, The Abdus Salam International Centre for Theoretical Physics (ICTP), Miramare, Trieste, Italy.
- May 2010 Group of prof. L.Varani, Institut d'Electronique du Sud Universite Montpellier 2 , Montpellier, France, Joint researches.
- Nov.-Dec. 2010 Group of prof. L.Varani, Institut d'Electronique du Sud Universite Montpellier 2 , Montpellier, France, Joint researches.
- Jun–Jul 2011 Workshop and School on Topological Aspects of Condensed Physics, The Abdus Salam International Centre for Theoretical Physics (ICTP), Miramare, Trieste, Italy.
- Jul 2011 Fifth Stig Lundquist Conference on the Advancing Frontiers of Condensed Matter Physics, The Abdus Salam International Centre for Theoretical Physics (ICTP), Miramare, Trieste, Italy.
- Dec. 2011 Group of prof. L.Varani, Institut d'Electronique du Sud Universite Montpellier 2 , Montpellier, France, Joint researches.
- Nov. 2013 Group of Dr. S.Vitusevich, Peter Gruenberg Institute, Forschungszentrum Juelich (PGI-FZJ), Julich, Germany, Joint researches in the frames BMBF project.
- May. 2014 Group of Dr. S.Vitusevich, Peter Gruenberg Institute, Forschungszentrum Juelich (PGI-FZJ), Julich, Germany, Joint researches in the frames BMBF project.

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## Total Publications: 37

### Publications in international refereed journals:12

- [1] Korotyeyev V.V, Kochelap V.A., Kim K.W., Woolard D.L. Streaming distribution of two-dimensional electrons in III-V heterostructures for electrically pumped terahertz generations.// Appl. Phys. Lett. 82 2643 (2003)
- [2] Komirenko S. M., Kim K. W., Kochelap V. A., Koroteev V. V., Stroschio M. A. Nonlinear regimes of coherent optical phonon generation under electric current pumping // Phys. Rev. B. 68. 155308 (2003)

- [3] Korotyeyev V.V., Kochelap V.A., Klimov A.A., Kim K.W., Woolard D.L. Tunable terahertz-frequency resonances and negative dynamic conductivity of two-dimensional electrons in group-III nitrides // *J. Appl. Phys.* 96 6488 (2004)
- [4] Kim K.W., Sokolov V.N., Kochelap V.A., Korotyeyev V.V., Woolard D.L. High-speed and high-frequency electron effects in nitride semiconductors for terahertz applications // *Phys. Stat. Sol. (c)*. 2 No 7, 2569-2572 (2005)
- [5] Korotyeyev V. V., Kochelap V. A. and Kim K. W. Electron transport in bulk GaN under ultrashort high-electric field transient// *Semicond. Sci. Technol.* 26 105008 (5pp) (2011)
- [6] V. V. Korotyeyev, V. A. Kochelap, A. A. Klimov, G. Sabatini, H. Marinchio, C. Palermo, and L. Varani, Theory of Ballistic Electron Transport in  $n^+i-n^+$  Diodes. Negative Dynamic Resistance in THz-Frequency Range// *Journal of Nanoelectronics and Optoelectronics* 6, 169–187, (2011)
- [7] T. Laurent, R. Sharma, J. Torres, P. Nouvel, S. Blin, L. Varani, Y. Cordier, M. Chmielowska, S. Chenot, J.-P. Faurie, B. Beaumont, P. Shiktorov, E. Starikov, V. Gruzinskis, V. V. Korotyeyev, and V. A. Kochelap Voltage-controlled sub-terahertz radiation transmission through GaN quantum well structure//*Appl. Phys. Lett.* 99, 082101 (2011)
- [8] V.V. Korotyeyev, V.A. Kochelap, G. Sabatini, H. Marinchio, C. Palermo and L.Varani, Theory of ballistic electron transport in  $n^+i-n^+$  diodes. Properties in THz frequency range// (Chapter 10 in "Handbook of nanoscience engineering and technology"edited by W.A. Goddard, D.W. Brenner, S.E. Lyshevski and G.J. Iafrate.), 239-275, CRC Press (2012).
- [9] V. V. Korotyeyev, V. A. Kochelap, and L. Varani. Wave excitations of drifting two-dimensional electron gas under strong inelastic scattering// *J. Appl. Phys.* 112, 083721 (2012)
- [10] G I Syngayivska, V V Korotyeyev and V A Kochelap. High-frequency response of GaN in moderate electric and magnetic fields: interplay between cyclotron and optical phonon transient time resonances// *Semicond. Sci. Technol.* 28 035007 (6pp) (2013)
- [11] H. Marinchio, C. Palermo, A. Mahi, L. Varani, and V. Korotyeyev External excitation of hybrid plasma resonances in a gated semiconductor slab: An analytical study// *J. Appl. Phys.* 116, 013707 (2014).
- [12] Anna Persano,Jeremie Torres, Vadym V. Korotyeyev, Yu M. Lyaschuk, Philippe Nouvel, Luca Francioso, Luca Varani, and Adriano Cola On the transmission of terahertz radiation through silicon-based structures// *J. Appl. Phys.* 116, 044504 (2014).

#### Publications in national refereed journals:6

- [1] Syngayivskaya G.I., Korotyeyev V.V. Monte Carlo Simulation of hot electron effects in compensated GaN semiconductor at moderate electric fields // *Semiconductor Physics, Quantum Electronics & Optoelectronics*. 10, No 4, 54-59 (2007).
- [2] Korotyeyev V.V., Syngayivska G.I, Kochelap V.A. and Klimov A.A., Comparison of electron transport in polar materials for the models of low-density and high-density electron gas. Application to bulk GaN.// *Semiconductor Physics, Quantum Electronics & Optoelectronics* 12, No 4, 328-338 (2009)

- [3] Lyaschuk Yu. M. and Korotyeyev V. V.// Interaction of terahertz electromagnetic field with a metallic grating: Near-field zone, Ukrainian Journal of Physical Optics 13(3), 142-150 (2012)
- [4] G.I. Syngayivska and V.V. Korotyeyev Electrical and high-frequency properties of compensated GaN under electron streaming conditions//Ukrainian Journal of Physics 58, No.1, 40-55 (2013).
- [5] V.V. Korotyeyev Peculiarities of THz-electromagnetic wave transmission through the GaN films under conditions of cyclotron and optical phonon transit-time resonances // Semiconductor Physics, Quantum Electronics & Optoelectronics. 16, No 1, 18-26 (2013).
- [6] Yu.M. Lyaschuk, V.V. Korotyeyev Interaction of a Terahertz electromagnetic wave with the plasmonic system “Grating– 2D-gas”. Analysis of features of the near field. // Ukrainian Journal of Physics 59, No 5, 495-504 (2014).

[Contributions to conference proceedings: 19](#)

- [1] Korotyeyev V.V., Kochelap V.A. Effects of electron heating of 2D electrons in semiconductor heterostructures.(in Russian) //1-st Ukrainian Conference on Semiconductor Physics (UCSP-1), Odessa, Ukraine, Book of Abstract V.2, pp.13, (2002)
- [2] Korotyeyev V.V., Kochelap V.A., Klimov A.A. Theory of high-frequency negative differential conductivity and THz generation under electron streaming in semiconductor heterostructures.// 2-nd Ukrainian Conference on Semiconductor Physics(UCSP-2). Chernivtsi, Ukraine, Book of Abstract V.2, pp.34-35, (2004)
- [3] Korotyeyev V.V., Kochelap V.A., Klimov A.A. High frequency negative differential conductivity and THz oscillations under electron streaming in semiconductor heterostructures (linear and nonlinear analysis).// International Conference 'Nanophysics and Nanoelectronics', Nizhny Novgorod, Russia, Book of Abstract V.2, p.358-359, (2005)
- [4] Kim K.W., Sokolov V.N., Kochelap V.A., Korotyeyev V.V., Nitride-based two-terminal oscillators operating in the THz regime// "Terahertz for military and security applications III"Orlando, USA, Proceedings of SPIE 5790-24, V.2 (p11), (2005)
- [5] Korotyeyev V.V., Kochelap V.A., Optical phonon-real space transient time resonance and negative dynamic resistance in a nanoscale ballistic diode// 3-rd Ukrainian Conference on Semiconductor Physics (UCSP-3), Odessa, Ukraine, Book of Abstract, p.340, (2007)
- [6] Syngayivskaya G.I., Korotyeyev V.V. Heating effects of electron gas in group III nitrides in moderate electric fields// 3-rd Ukrainian Conference on Semiconductor Physics (UCSP-3), Odessa, Ukraine,Book of Abstract, p.205, (2007)
- [7] Korotyeyev V.V., Kochelap V.A., Klimov A.A., Theory of transit-time resonance in ballistic n+-i-n+ diodes. The diode response in THz frequency range// 4-th International Conference on Advanced Optoelectronics and Lasers (CAOL 2008.) Alushta, Crimea, Ukraine, Book of Abstract, p. 261-263 (2008).
- [8] Korotyeyev V.V., Kochelap V.A., Klimov A.A., Optical phonon instability caused by ultra-high-speed electron transport in nanoscale samples// 4-th International Conference on Advanced Optoelectronics and Lasers (CAOL 2008.) Alushta, Crimea, Ukraine, Book of Abstract ; p. 264-266 (2008).

- [9] V. V. Korotyeyev and V. A. Kochelap Theory of ballistic electron transport in  $n^+-i-n^+$  diodes// 4-th Ukrainian Conference on Semiconductor Physics, Zaporizhia, Ukraine, Book of Abstract, V.1, p.103-104, (2009)
- [10] Syngayivskaya G.I., Korotyeyev V.V, Effect of anisotropy of high-frequency mobility induced by electric field in compensated GaN(in Ukrainian) // 5-th Ukrainian Conference on Semiconductor Physics (UCSP-5), Uzhhorod, Ukraine, Book of Abstract, p.344-345, (2011)
- [11] V. A. Kochelap and V. V. Korotyeyev, Physics and theory of ballistic electron transport in nanoscale diodes:Properties in terahertz frequency range.// 5-th Ukrainian Conference on Semiconductor Physics (UCSP-5), Uzhhorod, Ukraine, Book of Abstract, p.55-56, (2011)
- [12] V. V. Korotyeyev and V. A. Kochelap Plasmons oscillation of two-dimensional electron gas in the case of strongly anisotropic distribution function(in Ukrainian) // 5-th Ukrainian Conference on Semiconductor Physics (UCSP-5), Uzhhorod, Ukraine, Book of Abstract, p.237-238, (2011)
- [13] V. V. Korotyeyev and V. A. Kochelap Plasmons oscillation of two-dimensional electron gas in the case of strongly anisotropic distribution function(in Ukrainian) // 5-th Ukrainian Conference on Semiconductor Physics (UCSP-5), Uzhhorod, Ukraine, Book of Abstract, p.237-238, (2011)
- [14] T. Laurent, R. Sharma, J. Torres, P. Nouvel, S. Blin, L. Varani, Y. Cordier, M. Chmielowska, S. Chenot, J.-P. Faurie, B. Beaumont, P. Shiktorov, E. Starikov, V. Gruzinskis, V. V. Korotyeyev, and V. A. Kochelap, Voltage-control of terahertz transmission through GaN quantum well: Experiment and Theory. 17-th International Conference on Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures (EDISON 17), Santa Barbara, CA, USA August, 2011, Book of Abstracts p.93.
- [15] A. Penot, J. Torres, T. Laurent, R. Sharma, P. Nouvel, S. Blin, L. Varani, W. Knap, Y. Codier, M. Chmielowska, S. Chenot J.-P. Faurie, B. Beaumont P. Shiktorov, E. Starikov, and V. Gruzinskis V. V. Korotyeyev and V. A. Kochelap THz transmission modulated by a dc-bias through GaN quantum well structure: Terahertz Technology and Applications V , San Francisco, California, USA . Proc. SPIE 8261, 826111 (2012)
- [16] V. V. Korotyeyev, V. A. Kochelap and L. Varani Theory of ballistic electron transport in submicron  $n^+-i-n^+$  diodes. Negative dynamic resistance in THz frequency range (in Russian) // 3-rd International Scientific Conference 'Nanostructured material' (NANO-2012), Saint-Petersburg, Russia, Book of Abstract, p.80, (2012)
- [17] G. I. Syngayivskaya, V. V. Korotyeyev and V. A. Kochelap Electrical and high-frequency properties in compensated GaN under conditions of electron streaming (in Russian) // 3-rd International Scientific Conference 'Nanostructured material' (NANO-2012), Saint-Petersburg, Russia, Book of Abstract, p.309, (2012)
- [18] V. V. Korotyeyev, G. I. Syngayivska and V. A. Kochelap Frequency and wave-vector dispersion of the microwave mobility of drifting electron gas in GaN// International Conference on Advanced Optoelectronics and Lasers CAOL 09-13 September, 2013, Sudak, Ukraine, Book of Abstract, p. 186-188 (2013)
- [19] V. V. Korotyeyev and Yu. M. Lyaschuk Effective coupling between THz electromagnetic radiation and 2D plasmons// International Conference on Advanced Optoelectronics and Lasers CAOL 09-13 September, 2013, Sudak, Ukraine, Book of Abstract, p. 248-250 (2013)

Other

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