

Andrei Sergeev

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Professional Preparation

Department of Quantum Electronics, Moscow Institute for Physics and Technology, Moscow, Russia	<i>Physics, Quantum Electronics</i>	M.S.	1980
Department of Physics, Moscow Pedagogical University, Moscow, Russia	<i>Theoretical Solid State Physics, Applied Physics</i>	Ph.D.	1987

Appointments

2004-	<i>Senior Researcher</i>	Dept. of ECE,	<i>University at Buffalo,</i>	Buffalo,	USA
2001-2004	<i>Associate Professor (Research)</i>	Dept. of ECE,	<i>Wayne State University,</i>	Detroit,	USA
1999-2001	<i>Research Associate</i>	Dept. of ECE,	<i>Wayne State University,</i>	Detroit,	USA
1997-98	<i>Humboldt Fellow</i>	Dept. of Physics,	<i>University of Regensburg,</i>		Germany
1996-97	<i>Senior Scientist</i>	Radiophysics Lab,	<i>Moscow State Pedagogical Uni.,</i>		Russia
1993-95	<i>Postdoc. Researcher</i>	Dept. of Physics,	<i>Ohio State University,</i>	Columbus,	USA
1988-93	<i>Senior Scientist</i>	Radiophysics Lab,	<i>Moscow State Pedagogical Uni.,</i>		Russia
1980-87	<i>Scientist</i>	Radiophysics Lab,	<i>Moscow State Pedagogical Uni.,</i>		Russia

Research interests

Research interests are concentrated in the areas of quantum transport and solid-state electronics. Specific research topics include:

- Ultrasensitive superconducting and semiconducting detectors. Hot-electron nanosensors and nanocalorimeters.
- Ultrafast sensors. Single-photon counters. Wide-band hot-electron mixers.
- Quantum transport in superconducting and semiconducting structures. Feynman-Keldysh diagram technique for nonequilibrium processes. Many-body effects in thermoelectric and thermomagnetic phenomena. Superconducting fluctuations.
- Electron-phonon interaction in disordered conductors, micro- and nanostructures.

Supervision of Ph.D. students:

1. Gogidze Vano (1994), *Leading Engineer, Winncom Technologies Corp., Solon, OH 44139*;
2. Kuminov Pavel (1997), *Senior Scientist, Moscow State Pedagogical University*.
3. Chulkova Galina (1997), *Associate Professor, Moscow State Pedagogical University*.

International awards:

Alexander von Humboldt fellowship (1998-1999), established by the Federal Republic of Germany for highly qualified non-German scientists.

Synergistic Activities

Professional organizations:

1. American Physical Society,
2. Alexander von Humboldt Association of America,
3. Institute of Physics.

Academic services:

Referee for *Physical Review Letters*, *Physical Review B*, *Europhysics Letters*, and *Institute of Physics*.

Publications

Over 70 scientific publications in refereed journals, including the most prestigious journals in the field (*Physical Review Letters*, *Physical Review B*, *Applied Physics Letters*, and *Europhysics Letters*). According to ISI Citation Database, these publications have been referenced in over 500 citations.

Publications in refereed journals

1. **A. Sergeev**, M. Reizer, and V. Mitin: Effects of electron-electron and electron-phonon interactions in weakly disordered conductors and heterostructures. – *Phys. Rev. B* **69**, 075310 (2004).
2. J.-F. Lin, J.P. Bird, L. Rotkina, **A. Sergeev**, V. Mitin: Large effects due to electron-phonon-impurity interference in the resistivity of Pt/C-Ga composite nanowires. - *Appl. Phys. Lett*, **84**, 3828 (2004).
3. **A. Sergeev**, V. Mitin and M. Reizer: On the nature of the logarithmic term in the resistivity of one-dimensional and quasi-one-dimensional conductors. – *WSEAS Trans. Math.* **3**, 370 (2004).
4. **A. Sergeev**, V. Mitin, B. Karasic, and E. Gershenson: Superconducting nanosensors with mesoscopic number of quasiparticles. - *Physica E* **19**, 173 (2003).
5. B.S. Karasik, B. Delaet, W.R. McGrath, J. Wei, M.E. Gershenson, and **A.V. Sergeev**: Experimental Study of Superconducting Hot-Electron Sensors for Submm Astronomy. - *IEEE Trans. Appl. Supercond.*, **13**(2), Part 1, 188 (2003).
6. **A. Sergeev**, M. Reizer, and V. Mitin: Particle-hole asymmetry in fluctuation thermoelectric and Hall effects. – *Phys. Rev. B* **66**, (2002).

7. **A. Sergeev**, V. Mitin and B. Karasik: Ultrasensitive kinetic-inductance detectors operating well below the superconducting transition. - *Appl. Phys. Lett.*, **80**, 817 (2002).
8. **A. Sergeev** and V. Mitin: Effect of electronic disorder on phonon-drag thermopower. - *Phys. Rev. B.* **65**, 064301 (2002).
9. T. Sugaya, J.P. Bird, D.K. Ferry, **A. Sergeev**, V. Mitin, K.-Y. Yang, M. Ogura, and Y. Sugiyama: Experimental studies of the electron-phonon interaction in InGaAs quantum wires. - *Appl. Phys. Lett.*, **81**, 727 (2002).
10. **A. Sergeev**, V. Mitin, and M. Strosio: Quantum-dot photodetector operating at room temperatures: Diffusion-limited capture. - *Physica B*, **316-317**, 369 (2002).
11. **A. Sergeev**, B. Karasik, M. Gershenson, and V. Mitin: Electron-phonon scattering in disordered metallic films. - *Physica B*, **316-317**, 328 (2002).
12. **A. Sergeev** and V. Mitin: Phonon drag in disordered films and structures. - *Physica B*, **316-317**, 276 (2002).
13. **A. Sergeev**, B. Karasik, I. Goghidze, and V. Mitin: Ultrasensitive hot-electron kinetic-inductance detectors. - *AIP Conf. Proc.* **605**, 27 (2002).
14. B. Karasik, **A. Sergeev**, and M. Gershenson: Electron-phonon relaxation below 1K. - *AIP Conf. Proc.* **605**, 75 (2002).
15. Ch. Helm, J. Keller, Ch. Preis, and **A. Sergeev**: Static charge coupling of intrinsic Josephson junctions. - *Physica C* **362**, 43-50 (2001).
16. M.E. Gershenson, D. Gong, T. Sato, B.S. Karasik, and **A.V. Sergeev**: Millisecond electron-phonon relaxation in ultrathin disordered metal films at millikelvin temperatures. - *Appl. Phys. Lett.* **79**, 2049-2051 (2001).
17. V.V. Mitin, V.I. Pipa, **A.V. Sergeev**, M. Dutta, and M. Strosio: High-gain quantum-dot infrared photodetector. - *Infrared Phys. & Technol.* **42**, 467-472 (2001).
18. **A. Sergeev** and V. Mitin: Electron-phonon interaction in disordered conductors: Static and vibrating scattering potentials. - *Phys. Rev. B.* **61**, 6041-6047 (2000).
19. **A. Sergeev** and V. Mitin: Breakdown of Pippard ineffectiveness condition for phonon-electron scattering in micro and nanostructures. - *Europhys. Lett.* **51**, 641-647 (2000).
20. **A. Sergeev** and V. Mitin: Effect of boundaries and impurities on electron-phonon dephasing. - *Superlatt. and Microstruct.* **27**, 499-504 (2000).
21. **A. Sergeev**, Ch. Preis and J. Keller: Phonon Self-Energy in Superconductors: Effect of Vibrating Impurities. - *Phys. Rev. B.* **62**, 5896-5903 (2000).
22. B. S. Karasik, W. R. McGrath, M. E. Gershenson, and **A.V. Sergeev**: Photon-noise-limited direct detector based on disorder-controlled electron heating, - *J. Appl. Phys.* **87**, 7586-7588 (2000).
23. M. Reizer and **A. Sergeev** : Weak Localization Effect on Thermomagnetic Phenomena. - *Phys. Rev. B.* **61**, 7340-7347 (2000).
24. **A. Sergeev**, B.S. Karasik, N.G. Ptitsina: Electron-Phonon Interaction in Disordered Conductors. - *Physica B* **263-264**, 190 –193 (1999).
25. **A. Sergeev**: Inelastic Electron-Boundary Scattering in Thin Films, *Physica B* **263-264**, 217 – 219 (1999).
26. I.G. Gogidze, P.B. Kuminov, **A.V. Sergeev**, and E.M. Gershenson, Possibility of fabrication an inductive high-speed detector of electromagnetic radiation using YbaCuO films. – *Technical Physics Letters* **25**, 47-49 (1999).
27. **A. Sergeev**, Ch. Preis and J. Keller: Optical Phonon Attenuation in D-Wave Superconductors. - *Physica B* **263-264**, 733 – 735 (1999).

28. **A.V. Sergeev**, Electronic Kapitza resistance due to inelastic electron-boundary scattering. - *Phys. Rev. B* **58**, R10199-10202 (1998).
29. K.S. Il'in, N.G. Ptitsina, **A.V. Sergeev**, G.N. Gol'tsman, E.M. Gershenson, B.S. Karasik, E.V. Pechen, and S.I. Krasnosvobodtsev: Interrelation of Resistivity and Inelastic Electron ScatteringRate in Impure NbC Films. - *Phys. Rev. B* **57**, 15623-15628 (1998).
30. I.G. Gogidze, P.B. Kuminov, **A.V. Sergeev**, A.I. Elantev, A.I. Menschikov, and E.M. Gershenson: Fast nonequilibrium inductive detectors based on thin superconducting films. - *Technical Physics* **43**, 1193-1198 (1998).
31. K.D. Belashchenko, D.V. Livanov, and **A.V. Sergeev**: Effect of Electron-Electron Interaction on Thermoelectric Power in Impure Metals. - *JETP* **84**, 951-956 (1997).
32. N. G. Ptitsina, G. M. Chulkova, K. S. Il'in, **A. V. Sergeev**, F. S. Pochinkov, E. M. Gershenson, M. E. Gershenson, Electron-phonon interaction in disordered metal films: the resistivity and electron dephasing rate. - *Phys.Rev. B* **56**, 10089-10096 (1997).
33. M. Reizer, **A. Sergeev**, J.W. Wilkins, and D. Livanov: Onsager Relation and the Heat Current Operator in a System of Interacting Electrons and Phonons - *Annals of Phys.* **257**, 44-64 (1997).
34. A.D. Semenov, M.A. Heusinger, K.F. Renk, E. Menshikov, **A.V. Sergeev**, A.I. Elantev, I.G. Gogidze, and E.M. Gershenson: Influence of Phonon Trapping on the Performance of NbN Kinetic Inductance Detectors. - *IEEE Tran. on Applied Superconductivity* **7**, 3083-3086 (1997).
35. E.M. Menshikov, I.G. Gogidze, **A.V. Sergeev**, A.I. Elan'ev, P.B. Kuminov, G.N. Goltsman, and E.M. Gershenson: Superconducting Fast Detector based on the Nonequilibrium Inductance Response. - *Technical Physics Letters* **23**, 486-488 (1997).
36. **A.V. Sergeev** and M.Yu. Reizer: Photoresponse Mechanisms of Thin Superconducting Films and Superconducting Detectors. - *Int. J. Mod. Phys.* **10**, N6, 635-667 (1996).
37. **A.V. Sergeev**, M.Yu. Reizer and J.W. Wilkins: Renormalization of the Drude Conductivity by the Electron-Phonon Interaction. - *Phys. Rev. Lett.* **76**, 2374-2377 (1996).
38. **A.V. Sergeev**, M.Yu. Reizer and D.V. Livanov: Quantum Corrections to the Thermoelectric Transport in a System of Interacting Electrons and Phonons. - *Phys. Rev. B.* **50**, 18694-18696 (1994).
39. M.Yu. Reizer and **A.V. Sergeev**: Superconducting Fluctuation Effects on the Thermoelectric Coefficient above the Transition Temperature. *Phys. Rev. B* **50**, 9344-9350 (1994).
40. **A.V. Sergeev**, A.D. Semenov, P. Kouminov, V. Trifonov, I. Goghidze, B.S. Karasik, G.N. Goltsman, and E.M. Gershenson: Transparency of YBaCuO-Film/Substrate Interface for Thermal Phonons Measured by Means of Voltage Response to Radiation. - *Phys. Rev. B* **49**, 9091-9096 (1994).
41. **A.V. Sergeev**, A.D. Semenov, V. Trifonov, B.S. Karasik, G.N. Goltsman, and E.M. Gershenson: Heat Transfer in YBaCuO Thin Film - Sapphire Substrate System. - *Journal of Superconductivity* **7**, 341-344 (1994).
42. Y.P. Gusev, A.D. Semenov, **A.V. Sergeev**, and G.N. Goltsman: Electron-Phonon Interaction in Disordered NbN Films. - *Physica B* **194**, 1355-1356 (1994).
43. D.V. Livanov and **A.V. Sergeev**: Thermopower of High- T_c Materials and Electron-Phonon-Impurity Interference. - *Phys. Rev. B* **48**, 13137-13140 (1993).
44. A.D. Semenov, I.G. Goghidze, G.N. Goltsman, **A.V. Sergeev** and E.M. Gershenson: Evidence for the Spectral Dependence of Nonequilibrium Picosecond Photoresponse of YBaCuO Thin Films. - *Appl. Phys. Letters* **63**, 681-683 (1993).
45. **A.V. Sergeev**, E.E. Aksaev, I.G. Goghidze, G.N. Goltsman, A.D. Semenov, and E.M. Geshenson: Thermal Boundary Resistance at YBaCuO Film-SubstrateInterface. *Springer Series in Solid-State*

- Sciences* **112**, Eds.: M. Meissner and R.O. Pohl, Springer-Verlag Berlin Heidelberg 1993, p.405-407.
46. **A.V. Sergeev** and D.V. Livanov: Phonon Renormalization of Thermoelectric Power of High- T_c Materials. *Springer Series in Solid-State Sciences* **112**, Eds.: M.Meissner and R.O. Pohl, Springer-Verlag Berlin Heidelberg 1993, p.204-205.
 47. A.D. Semenov, I.G. Goghidze, G.N. Goltsman, **A.V. Sergeev**, E.E. Aksaev and E.M. Gershenzon: Nonequilibrium Quasiparticle Response to Radiation and Bolometric Effect in YBaCuO films. - *IEEE Trans. on Appl. Supercond.* **3**, 2132-2136 (1993).
 48. A.D. Semenov, G.N. Goltsman, I.G. Gogidze, **A.V. Sergeev**, E.M. Gershenzon, P.T. Lang and K.F. Renk: Subnanosecond Photoresponse of a YBaCuO Thin Film to Infrared and Visible Radiation by Quasiparticle Induced Suppression of Superconductivity. - *Appl. Phys. Letters* **60**, 903-906 (1992).
 49. E.M. Gershenzon, G.N. Goltsman, A.D. Semenov, and **A.V. Sergeev**: Mechanism of Picosecond Response of Antigranulocytes YBaCuO Films to Electromagnetic Radiation. - *IEEE Trans. on Magn.* **27**, 1321-1323 (1991).
 50. E.M. Gershenzon, G.N. Goltsman, A.D. Semenov, and **A.V. Sergeev**: Processes of Electron-Phonon Interaction in Thin YbaCuO Films. - *Physica C* **185**, 1371-1372 (1991).
 51. D. V. Livanov, M. Yu. Reizer and **A.V. Sergeev**: Effect of Electron-Electron Interaction on the Thermal Conductivity of Impure Metals. - *Physica B* **169**, 483-484 (1991).
 52. E.M. Gershenzon, G.N. Goltsman, A.D. Semenov, and **A.V. Sergeev**: Wide-Band High-Speed Nb and YBaCuO detectors. - *IEEE Trans. on Magn.* **27**, 2836-2388 (1991).
 53. E.M. Gershenzon, G.N. Goltsman, A.D. Semenov, and **A.V. Sergeev**: Picosecond Response on Optical Range Emission in Thin YBaCuO Films. - *Technical Physics Letters* **17**, 6-10 (1991).
 54. E.M. Gershenzon, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Mechanism of Picosecond Response of Granular YBaCuO Films to Electromagnetic Radiation. - *Solid State Comm.* **76**, 493-496 (1990).
 55. E.M. Gershenzon, G.N. Goltsman, V.D. Potapov and **A.V. Sergeev**: Restriction of Microwave Enhancement of Superconductivity in Impure Superconductors due to the Electron-Electron interaction. - *Solid State Comm.* **75**, 639-642 (1990).
 56. E.M. Gershenzon, M.E. Gershenzon, G.N. Goltsman, A. Lulkin, A.D. Semenov and **A.V. Sergeev**: Electron-Phonon Interaction in Ultrathin Nb Films. - *JETP* **70**, 505-510 (1990).
 57. D. V. Livanov, M. Yu. Reizer and **A.V. Sergeev**: Effect of Electron-Electron Interaction on the Thermal Conductivity of Impure Metals. - *JETP* **72**, 760-764 (1990).
 58. E.E. Aksaev, E.M. Gershenzon, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Mechanisms of Electromagnetic Radiation Detection in YBaCuO Films. - *Superconductivity* **3**, 328-339 (1990).
 59. E.E. Aksaev, E.M. Gershenzon, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Prospects for Use of High- T_c Superconductors to Develop Electronic Bolometers. - *Sov. Phys. Technical Physics Letters* **15**, 575-577 (1989).
 60. E.E. Aksaev, E.M. Gershenzon, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Electrons and Low Energy Phonon Interaction in YBaCuO films at low temperatures. - *JETP Letters* **50**, 283-286 (1989).
 61. E.M. Gershenzon, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Limiting Characteristic of Fast Superconducting Bolometers. - *Sov. Phys. Technical Physics* **34**, 195-199 (1989).
 62. E.M. Gershenzon, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Radiation Heating of Electrons and Inelastic Electron-Phonon Scattering Time in YBaCuO. - *JETP Letters* **46**, 285-287 (1987).

63. M.Yu. Reizer and **A.V. Sergeev**: Phonon Renormalization of the Thermoelectric Power of Impure Metals. - *JETP* **66**, 1250-1257 (1987).
64. M.Yu. Reizer and **A.V. Sergeev**: Effect of the Electron-Phonon Interaction on the Conductivity of Impure Metals. - *JETP* **65**, 1291-1298 (1987).
65. M.Yu. Reizer and **A.V. Sergeev**: Electron-Phonon Interaction in Impure Metals and Superconductors. *JETP* **63**, 616-624 (1986).
66. E.M. Gershenson, M.E. Gershenson, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Electron Heating in Superconductor Resistive State due to Electromagnetic Radiation. - *Solid State Comm.* **50**, 207-210 (1984).
67. E.M. Gershenson, M.E. Gershenson, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Electron Heating in Superconductor Resistive State due to Electromagnetic Radiation. - *JETP* **59**, 442-448 (1984).
68. E.M. Gershenson, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Nonselective effect of electromagnetic radiation on a superconducting film in the resistive state. - *JETP Letters* **36**, 296-298 (1982).
69. E.M. Gershenson, M.E. Gershenson, G.N. Goltsman, A.D. Semenov and **A.V. Sergeev**: Heating of Quasiparticles in a Superconducting Film in the Resistive State. - *JETP Letters* **34**, 268-270 (1981).
70. S.N. Artemenko, A.F. Volkov and **A.V. Sergeev**: On the Theory of the Resistive State in Superconductors. - *J. Low Temp. Phys.* **44**, 405-421 (1981).
71. A.F. Volkov and **A.V. Sergeev**: The Effect of the Electromagnetic Radiation on the Point Contact Superconductor-Normal Metal. - *Sov. Phys. Technical Physics* **26**, 989-993 (1981).