

CURRICULUM VITAE of Oleg M. BRAUN

Surname: BRAUN

First name: Oleg M.

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Nationality: Russian

Citizenship: Ukraine

Education (degrees, institutions, dates)

Dr.Sci. ("Doctor of Sciences", Solid State Physics), 1991, Institute of Physics (Kiev)

Ph.D. ("Candidate of Sciences", Physical Electronics), 1983, Institute of Physics (Kiev)

Diploma in Physics (Radiophysics), 1972, University of Kiev

Career/Employment (employers, positions, dates)

Institute of Physics (Kiev): Leading Research Fellow (1992–Present); Senior Research Fellow (1988–1992); Research Fellow (1986–1988); Junior Research Fellow (1979–1986)

ICTP and SISSA (Trieste), Milan University (Italy): Visitor, 2007, 2008, 2009

Institut für Festkörperforschung, Jülich (Germany): Visitor, 1999, 2006

Hong Kong Baptist University (China): University Fellow, 1998; Visitor, 2000, 2004

Los Alamos National Laboratory (USA): Consultant, 1997, 2001; Visitor, 1998

Membership of Professional Societies

Member of Ukrainian Physical Society (1991)

Prize

The State Prize of Ukraine in the field of science and technology (2008)

Specialization

(a) *main field:* nonlinear physics, stochastic equations, theoretical and numerical studies of surfaces and adsorbed layers, tribology

(b) *current research interests:* nanotribology; nonlinear dynamics of discrete systems with applications to various models of solid state physics and surface physics; Monte Carlo dynamics of complex lattice-gas models; diffusion in two-dimensional nonlinear models of solids

Publications

Number of books: 1

Number of papers in refereed journals: 96

Number of communications to scientific meetings: 35

Teaching

University of Kiev: Full Professor (adjunct), 1992–1993

University of Kiev: Associate Professor (adjunct), 1988–1991

Teaching courses

1. *Computer Modelling in Physics*, 1988–1992, University of Kiev (Department of Radiophysics)
2. *Theoretical Aspects of Solid State Physics*, 1991–1992, *ibid.*
3. *Surface Science*, 1992–1993, *ibid.*

LIST OF PUBLICATIONS of Oleg M. BRAUN

Book and Survey papers

1. O. M. Braun and A. G. Naumovets, Surf. Sci. Reports **60** (2006) 79-158 "*Nanotribology: Microscopic mechanisms of friction*"
2. O. M. Braun and Yu. S. Kivshar, "*The Frenkel-Kontorova Model: Concepts, Methods, and Applications*" (Springer-Verlag, Berlin, 2004)
3. O. M. Braun and Yu. S. Kivshar, Physics Reports **306** (1998) 1-108 "*Nonlinear dynamics of the Frenkel-Kontorova model*"
4. O. M. Braun, A. I. Volokitin, and V. P. Zhdanov, Usp. Fiz. Nauk **158** (1989) 421-450 [Sov. Phys. Usp. **32** (1989) 605-621] "*Vibration spectroscopy of adsorbates*"
5. O. M. Braun and V. K. Medvedev, Usp. Fiz. Nauk **157** (1989) 631-666 [Sov. Phys. Usp. **32** (1989) 328-348] "*Interaction between particles adsorbed on metal surfaces*"
6. O. M. Braun, Ukr. Fiz. Zh. **23** (1978) 1233-1255 "*Theoretical models of chemisorption on metals*"

Original papers

1. O. M. Braun and E. Tosatti, Europhys. Lett. **88** (2009) 48003 "*Kinetics of stick-slip friction in boundary lubrication*"
2. O. M. Braun, I. Barel, and M. Urbakh, Phys. Rev. Lett. **103** (2009) 194301 "*Dynamics of transition from static to kinetic friction*"
3. Oleg M. Braun, Nicola Manini, and Erio Tosatti, Phys. Rev. B **78** (2008) 195402 "*Role of lubricant molecular shape in microscopic friction*"
4. O. M. Braun and Erio Tosatti, J. Phys.: Condens. Matter **20** (2008) 354007 "*Molecular rolling friction: the cogwheel model*"
5. Oleg M. Braun and Erio Tosatti, Philosophical Magazine Letters **88** (2008) 509 "*Rack-and-pinion effects in molecular rolling friction*"
6. O. M. Braun, Physica Scripta **78** (2008) 015802 "*Phenomenological theory of kinetic friction for the solid lubricant film*"
7. A. Vanossi, G. E. Santoro, N. Manini, E. Tosatti, and O. M. Braun, Tribology International **41** (2008) 920 "*Lubricated friction between incommensurate substrates*"
8. O. M. Braun and M. Peyrard, Phys. Rev. Lett. **100** (2008) 125501 "*Modeling friction on a mesoscale: Master equation for the earthquake-like model*"
9. A. Vanossi and O. M. Braun, J. Phys.: Condens. Matter **19** (2007) 305017 "*Driven dynamics of simplified tribological models*"
10. A. Vanossi and O. M. Braun, In: *Advances in Contact Mechanics: Implications for Materials Science, Engineering and Biology*, Eds. Renato Buzio and Ugo Valbusa (Cambridge University Press, Cambridge, 2007) pp. 117-144 "*Simulation of nanofriction through driven simplified models*"
11. A.V. Zhukov, M.V. Paliy, O.M. Braun, and T.F. George, Phys. Lett. A **361** (2007) 437 "*Two-stage melting in tribological systems*"

12. M. Paliy, O.M. Braun, and S. Consta, *Tribology Letters* **23** (2006) 7 “*The friction properties of an ultrathin confined water film*”
13. O. M. Braun, M. Peyrard, V. Bortolani, A. Franchini, and A. Vanossi, *Phys. Rev. E* **72** (2005) 056116 “*Transition from smooth sliding to stick-slip motion in a single frictional contact*”
14. O. M. Braun, *Ukrainian Journal of Physics* **50** (2005) 753 “*Jamming in Nonlinear Driven Models*”
15. O. M. Braun, *Physica A* **357** (2005) 350 “*Phase segregation in driven diffusive systems*”
16. O. M. Braun, *Phys. Rev. Lett.* **95** (2005) 126104 “*Simple model of microscopic rolling friction*”
17. O. M. Braun, A. Vanossi, and E. Tosatti, *Phys. Rev. Lett.* **95** (2005) 026102 “*Incommensurability of a confined system under shear*”
18. O. M. Braun and Bambi Hu, *Phys. Rev. E* **71** (2005) 032103 “*Clustering of atoms in a model with multiple thermostats*”
19. O. M. Braun and Bambi Hu, *Phys. Rev. E* **71** (2005) 031111 “*Two-dimensional two-state lattice-gas model*”
20. J. Tekić, O. M. Braun, and Bambi Hu, *Phys. Rev. E* **71** (2005) 026104 “*Dynamic phases in the two-dimensional underdamped driven Frenkel-Kontorova model*”
21. O. M. Braun, M. Paliy, and S. Consta, *Phys. Rev. Lett.* **92** (2004) 256103 “*Ordering of a thin lubricant film due to sliding*”
22. O. M. Braun, R. Ferrando, and G. E. Tommei, *Phys. Rev. E* **68** (2003) 051101 “*Stimulated diffusion of an adsorbed dimer*”
23. O. M. Braun and M. Peyrard, *Phys. Rev. E* **68** (2003) 011506 “*Dynamics and melting of a thin confined film*”
24. O. M. Braun, Hong Zhang, Bambi Hu, and J. Tekic, *Phys. Rev. E* **67** (2003) 066602 “*Driven kinks in the anharmonic Frenkel-Kontorova model*”
25. O. M. Braun and R. Ferrando, *Phys. Rev. E* **65** (2002) 061107 “*Role of long jumps in surface diffusion*”
26. O. M. Braun, In: *Atomic Aspects of Epitaxial Growth*, Eds. M. Kotrla et al. (Kluwer, 2002) pp. 31-42 “*Surface diffusion with a realistic damping coefficient*”
27. O. M. Braun and J. Röder, *Phys. Rev. Lett.* **88** (2002) 096102 “*Transition from stick-slip to smooth sliding: An earthquakelike model*”
28. O. M. Braun and M. Peyrard, *Phys. Rev. E* **63** (2001) 046110 “*Friction in a solid lubricant film*”
29. O. M. Braun, M. V. Paliy, J. Röder, and A. R. Bishop, *Phys. Rev. E* **63** (2001) 036129 “*Locked-to-running transition in the two-dimensional underdamped driven Frenkel-Kontorova model*”
30. O. M. Braun, *Phys. Rev. E* **63** (2001) 011102 “*Role of entropy barriers for diffusion in the periodic potential*”
31. O. M. Braun, *Phys. Rev. E* **62** (2000) 7315-7319 “*Supersonic and multiple topological excitations in the driven Frenkel-Kontorova model with exponential interaction*”

32. Yu. S. Kivshar, H. Benner, and O. M. Braun, "Nonlinear models for the dynamics of topological defects in solids", In: "Nonlinear science at the dawn of the 21st Century", Eds.: P. Christiansen et al. (Springer-Verlag, Berlin, 2000) pp. 265-291
33. O. M. Braun, Bambi Hu, and A. Zeltser, Phys. Rev. E **62** (2000) 4235-4245 "Driven kink in the Frenkel-Kontorova model"
34. Oleg Braun, Maxim Paliy, and Bambi Hu, Phys. Rev. Lett. **83** (1999) 5206-5209 "Fuse safety device on an atomic scale"
35. O. M. Braun, A. R. Bishop, and J. Röder, Phys. Rev. Lett. **82** (1999) 3097-3100 "Multistep locked-to-sliding transition in a thin lubricant film"
36. O. M. Braun and C. A. Sholl, Phys. Rev. B **58** (1998) 14870-14879 "Diffusion in generalized lattice-gas models"
37. O. M. Braun, T. Dauxois, M. V. Paliy, M. Peyrard, B. Hu, Physica D **123**, 357-367 (1998). "Kinks motion and underdamped dc-driven dynamics of atomic monolayers"
38. Oleg Braun and Bambi Hu, J. Stat. Phys. **92** (1998) 629-649 "Traffic jams in a lattice-gas model"
39. O. M. Braun, B. Hu, A. Filippov, and A. Zeltser, Phys. Rev. E **58** (1998) 1311-1324 "Traffic jams and hysteresis in driven one-dimensional systems"
40. O. M. Braun, O. A. Chubykalo, Yu. S. Kivshar, and T. P. Valkering, Physica D **113** (1998) 152-156 "The Frenkel-Kontorova model with a transverse degree of freedom: kinks structures"
41. O. M. Braun, A. R. Bishop, and J. Röder, Phys. Rev. Lett. **79** (1997) 3692-3695 "Hysteresis in the underdamped driven Frenkel-Kontorova model"
42. Oleg M. Braun, Yuri S. Kivshar, and Michel Peyrard, Phys. Rev. E **56** (1997) 6050-6064 "Kink's internal modes in the Frenkel-Kontorova model"
43. Oleg M. Braun, Theo P. Valkering, Joost H. J. van Opheusden, and H. J. W. Zandvliet, Surface Sci. **384** (1997) 129-135 "Substrate-induced pairing of Si ad-dimers on the Si(100) surface"
44. Maxim Paliy, Oleg Braun, Thierry Dauxois, and Bambi Hu, Phys. Rev. E **56** (1997) 4025-4030 "Dynamical phase diagram of the dc-driven underdamped Frenkel-Kontorova chain"
45. Oleg M. Braun, Thierry Dauxois, and Michel Peyrard, Phys. Rev. B **56** (1997) 4987-4995 "Friction in a thin commensurate contact"
46. O. M. Braun, M. V. Paliy, and M. Peyrard, Phys. Rev. B **55** (1997) 4797-4810 "Growth of ordered domains in a highly anisotropic two-dimensional system"
47. Oleg M. Braun, Thierry Dauxois, Maxim V. Paliy, and Michel Peyrard, Phys. Rev. E **55** (1997) 3598-3612 "Nonlinear mobility of the generalized Frenkel-Kontorova model"
48. Oleg M. Braun, Thierry Dauxois, Maxim V. Paliy, and Michel Peyrard, Phys. Rev. Lett. **78** (1997) 1295-1298 "Dynamical transitions in correlated driven diffusion in a periodic potential"
49. Oleg M. Braun, Thierry Dauxois, Maxim V. Paliy, and Michel Peyrard, Phys. Rev. B **54** (1996) 321-331 "Mobility and diffusivity in a generalized Frenkel-Kontorova model"
50. Oleg M. Braun, Thierry Dauxois, and Michel Peyrard, Phys. Rev. B **54** (1996) 313-320 "Solitonic-exchange mechanism of surface diffusion"
51. Oleg M. Braun, Oksana A. Chubykalo, and Theo P. Valkering, Phys. Rev. B **53** (1996) 13877-13882 "Structure of kinks for a complex ground state"

52. O. M. Braun and M. Peyrard, Phys. Rev. B 51 (1995) 17158-17167 *"The Frenkel-Kontorova model with a nonconvex transverse degree of freedom: a model for reconstructive surface growth"*
53. Eva Majerníková, Y. B. Gaididei, and O. M. Braun, Phys. Rev. E 52 (1995) 1241-1244 *"Non-linear transient dynamics of the driven Klein-Gordon solitons"*
54. O. M. Braun and M. Peyrard, Phys. Rev. E 51 (1995) 4999-5015 *"Ground state of the Frenkel-Kontorova model with a transverse degree of freedom"*
55. O. M. Braun and Yu. S. Kivshar, Phys. Rev. B 50 (1994) 13388-13400 *"Concentration dependence of conductivity and diffusivity in one-dimensional anharmonic lattices"*
56. O. M. Braun and M. V. Paliy, Phys. Rev. Lett. 73 (1994) 2091-2094 *"Growth kinetics in a lattice-gas model with anisotropic jump probabilities"*
57. O. M. Braun, I. I. Zelenskaya, and Yu. S. Kivshar, Int. J. Mod. Phys. B 8 (1994) 2353-2389 *"Diffusion in the Frenkel-Kontorova model with anharmonic interatomic interactions"*
58. O. M. Braun, O. A. Chubycalo, and L. Vázquez, Phys. Lett. A 191 (1994) 257-260 *"Dimerized ground state of the Frenkel-Kontorova model with a transversal degree of freedom"*
59. O. M. Braun, O. A. Chubycalo, Yu. S. Kivshar, and L. Vázquez, Phys. Rev. B 48 (1993) 3734-3743 *"Frenkel-Kontorova model with a transversal degree of freedom: Static properties of kinks"*
60. O. M. Braun and Yu. S. Kivshar, Phys. Rev. B 44 (1991) 7694-7697 *"Zigzag kinks in the Frenkel-Kontorova model with a transversal degree of freedom"*
61. O. M. Braun and Yu. S. Kivshar, Phys. Rev. B 43 (1991) 1060-1073 *"Nonlinear dynamics of the Frenkel-Kontorova model with impurities"*
62. O. M. Braun, I. I. Zelenskaya, and Yu. S. Kivshar, Poverkhn (USSR) # 8 (1991) 22-27 *"Peierls relief for the Frenkel-Kontorova model with long-range interactions"*
63. O. M. Braun, Zhang Fei, Yu. S. Kivshar, and L. Vázquez, Phys. Lett. A 157 (1991) 241-245 *"Kinks in the Klein-Gordon model with anharmonic interatomic interactions: a variational approach"*
64. O. M. Braun, Kinetika i katalis 31 (1990) 1356-1360 *"Activation energy for the motion of a linear molecule in the periodic potential"*
65. O. M. Braun and Yu. S. Kivshar, Phys. Lett. A 149 (1990) 119-123 *"Discreteness effects in the kink scattering by a mass impurity"*
66. O. M. Braun, I. I. Zelenskaya, and Yu. S. Kivshar, Ukr. Fiz. Zh. 35 (1990) 1235-1240 *"The interaction of kinks in the nonlinear Frenkel-Kontorova model"*
67. O. M. Braun, Surface Sci. 230 (1990) 262-276 *"Adiabatic motion of an atomic chain in periodic potential"*
68. O. M. Braun and Yu. S. Kivshar, J. Phys.: Condensed Matter 2 (1990) 5961-5970 *"Kinks in a system of adatomic chains"*
69. O. M. Braun and Yu. S. Kivshar, Fiz. Tverd. Tela 32 (1990) 1399-1405 *"Kinks in a quasi-two-dimensional system"*
70. O. M. Braun, Yu. S. Kivshar, and I. I. Zelenskaya, Phys. Rev. B 41 (1990) 7118-7138 *"Kinks in the Frenkel-Kontorova model with long-range interparticle interactions"*

71. O. M. Braun, Surface Sci. **213** (1989) 336-358 *"Energy exchange in adsorbed layers"*
72. O. M. Braun, Yu. S. Kivshar, and A. M. Kosevich, J. Phys. C **21** (1988) 3881-3900 *"Interaction between kinks in coupled chains of adatoms"*
73. O. M. Braun, Radiofizika (Izv. VUZ) **30** (1987) 788-794 [Radiophys. Quantum Electron. (USA) **30** (1987) 590-596] *"Evolution of vibrational excitation of an adsorbed atom"*
74. O. M. Braun, Poverkhn (USSR) # 11 (1987) 5-13 *"Interaction between vibrational modes of an adsorbed atom"*
75. A. I. Volokitin and O. M. Braun, Poverkhn (USSR) # 2 (1987) 19-25 *"Lifetime and frequency shift of vibrations of chemisorbed atoms"*
76. O. M. Braun and A. I. Volokitin, Fiz. Tverd. Tela **28** (1986) 1008-1014 [Sov. Phys. - Solid State (USA) **28** (1986) 564-567] *"Electron-hole friction mechanism in the vibration of chemisorbed atoms"*
77. O. M. Braun and E. A. Pashitsky, Ukr. Fiz. Zh. **31** (1986) 1839-1845 *"On the possibility of photostimulated phase transitions in submonolayer films adsorbed on semiconductor surfaces"*
78. A. I. Volokitin, O. M. Braun, and V. M. Yakovlev, Surface Sci. **172** (1986) 31-46 *"Shift and broadening of adsorbate vibrational modes"*
79. O. M. Braun and E. A. Pashitsky, Poverkhn (USSR) # 6 (1986) 5-13 [Phys. Chem. Mech. Surf. (UK) **5** (1990) 1311-1326] *"Dynamic interaction of oscillating chemisorbed atoms on a semiconductor surface"*
80. O. M. Braun and E. A. Pashitsky, Poverkhn (USSR) # 7 (1984) 49-55 [Phys. Chem. Mech. Surf. (GB) **3** (1985) 1989-2003] *"Vibrational excitation and surface diffusion of hydrogen atoms on tungsten"*
81. O. M. Braun and E. A. Pashitsky, Poverkhn (USSR) # 6 (1984) 5-14 [Phys. Chem. Mech. Surf. (GB) **3** (1985) 1587-1606] *"Local vibrations of hydrogen atoms adsorbed on tungsten surfaces"*
82. O. M. Braun and A. I. Volokitin, Surface Sci. **131** (1983) 148-158 *"On the role of image forces in chemisorption theory"*
83. O. M. Braun and A. I. Volokitin, Fiz. Tverd. Tela **25** (1983) 309-311 [Sov. Phys. - Solid State (USA) **25** (1983) 177-178] *"Exact solution of the local polaron model"*
84. O. M. Braun and E. A. Pashitsky, Fiz. Tverd. Tela **24** (1982) 3333-3338 [Sov. Phys. - Solid State (USA) **24** (1982) 1893-1896] *"Peierls instability and charge density waves at the surface of a metal with a quasi-one-dimensional electron spectrum"*
85. O. M. Braun and E. A. Pashitsky, Fiz. Tverd. Tela **24** (1982) 1973-1980 [Sov. Phys. - Solid State (USA) **24** (1982) 1127-1131] *"Vibrations of a chemisorbed atom"*
86. O. M. Braun and A. I. Volokitin, Fiz. Tverd. Tela **23** (1981) 3530-3534 [Sov. Phys. - Solid State (USA) **23** (1981) 2052-2054] *"Contribution of the image potential to the chemisorption energy"*
87. O. M. Braun, Fiz. Tverd. Tela **23** (1981) 2779-2784 [Sov. Phys. - Solid State (USA) **23** (1981) 1626-1628] *"Special properties of indirect interaction of atoms adsorbed on metal surfaces"*
88. O. M. Braun, Fiz. Tverd. Tela **22** (1980) 2079-2083 [Sov. Phys. - Solid State (USA) **22** (1980) 1212-1214] *"Indirect interaction of hydrogen atoms adsorbed on the (110) face of tungsten"*
89. O. M. Braun, L. G. Il'chenko, and E. A. Pashitsky, Fiz. Tverd. Tela **22** (1980) 1649-1655 [Sov. Phys. - Solid State (USA) **22** (1980) 963-966] *"Adsorption of alkali metal atoms on transition metal surfaces with allowance for the image potential"*

90. O. M. Braun, Fiz. Tverd. Tela **22** (1980) 1638-1640 [Sov. Phys. - Solid State (USA) **22** (1980) 957-958] "*Density of electronic states in a chemisorbed atom*"
91. O. M. Braun, G. Ya. Pikus, and G. E. Chaika, Ukr. Fiz. Zh. **21** (1976) 744-751 "*Vacancy concentration and conductivity of BaO crystal at high temperature in vacuum*"
92. O. M. Braun, G. Ya. Pikus, and G. E. Chaika, Fiz. Tverd. Tela **17** (1975) 2768-2770 "*Calculation of dynamically equilibrium composition and conductivity of A^2B^6 crystals at high temperature in vacuum*"