

ILYA Y. DODIN

U.S. permanent resident (“green card”)

CURRICULUM VITAE

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PRINCETON UNIVERSITY

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PROFESSIONAL BACKGROUND

Analytical and numerical research in theoretical plasma physics and nonlinear dynamics.

Research interests: basic plasma physics, phase space engineering, ponderomotive forces, nonlinear dynamics, Hamiltonian systems, laser-plasma interactions, other wave-plasma interactions.

APPOINTMENTS

since 09/2009	Lecturer PRINCETON UNIVERSITY
since 11/2007	Associate Research Scholar PRINCETON UNIVERSITY
07/2005-11/2007	Postdoctoral Research Associate PRINCETON UNIVERSITY

EDUCATION

1999-2005 Ph.D. in Astrophysical Sciences (Plasma Physics)	PRINCETON UNIVERSITY Department of Astrophysical Sciences Graduate Program in Plasma Physics
2004 Candidate of Physical and Mathematical Sciences	INSTITUTE OF APPLIED PHYSICS, RUSSIAN ACADEMY OF SCIENCE Nizhniy Novgorod, Russia
1998-2000 Master Degree in Physics	NIZHNIY NOVGOROD STATE UNIVERSITY, Russia Advanced School of General and Applied Physics Program in Plasma Physics <i>Summa Cum Laude</i>
1994-1998 Bachelor Degree in Physics	NIZHNIY NOVGOROD STATE UNIVERSITY, Russia Advanced School of General and Applied Physics <i>Summa Cum Laude</i>

AWARDS/FELLOWSHIPS

- Honoric Harold W. Dodds Fellowship. Princeton University, academic year 2003-2004.
- Personal Grant of the Russian Foundation for Basic Research, 2002.
- First Prize of the 7th Nizhniy Novgorod Session of Young Scientists, Nizhniy Novgorod, Russia, 2002.
- First Year Merit Prize. Princeton University, 1999.
- Russian Government Fellowship. Nizhniy Novgorod State University, academic year 1998-1999.
- Soros Student Fellowship. Open Society Institute Soros Fund, academic year 1994-1995.

PROFESSIONAL ACTIVITIES

- Session Chair. Session BO4: *Laser Plasma Pulse Compression/Laboratory Astrophysics*, 50th Annual Meeting of the APS Division of Plasma Physics, Dallas, TX, Nov 16-21, 2008.
- Reviewer for US Civilian Research and Development Foundation.
- Reviewer for *Physical Review Letters*.
- Reviewer for *Physical Review E*.
- Reviewer for *Physics of Plasmas*.
- Reviewer for *Plasma Physics and Controlled Fusion*,
- Reviewer for *IEEE Transactions on Plasma Science*.

TEACHING EXPERIENCE

- Lecturer. Graduate course AST553, *Plasma Waves and Instabilities*, Princeton University; half of the course during the fall term of 2009-2010.
- Mini-course *Nonlinear Dynamics of Oscillation Centers*, Graduate course AST558, *Seminar in Plasma Physics*, Princeton University; four lectures during February–March 2009.
- Substitute lecturer. Graduate course AST557/APC503, *Analytical Techniques in Differential Equations I*, Princeton University; two lectures during the fall term of 2008-2009.
- Substitute lecturer. Undergraduate course *Complex Analysis*, Advanced School of General and Applied Physics of Nizhniy Novgorod State University, second half of the course, 10/2001-01/2002.
- Teaching assistant. Graduate course AST554, *Irreversible Processes in Plasmas*, Princeton University; spring term of 2002-2003.
- Teaching assistant. Graduate course AST551, *General Plasma Physics I*, Princeton University; fall term of 2002-2003.

INVITED TALKS

1. *Non-Newtonian mechanics and manipulation of oscillation centers*, International Workshop on the Frontiers of Modern Plasma Physics, ICTP, Trieste, Italy, Jul 14-25, 2008.
2. *Classical analogues of atom manipulation techniques using laser radiation*, Workshop on Quantum Reflection, ITAMP, Harvard University, Cambridge, MA, Oct 21-24, 2007.
3. *Particle manipulation with nonadiabatic ponderomotive forces*, 15th International Conference on Atomic Processes in Plasmas, Gaithersburg, MD, Mar 19-22, 2007.
4. *Manipulating the particle phase space with nonadiabatic ponderomotive barriers*, 47th Annual Meeting of the APS Division of Plasma Physics, Philadelphia, PA, Oct 30-Nov 3, 2006; Bulletin of the American Physical Society 51 (7), 332 (2006).
5. *Precise manipulations of the particle phase space with nonadiabatic ponderomotive barriers*, Attosecond Science Workshop, Santa Barbara, CA, Jul 31-Sep 15, 2006.
6. *Nonadiabatic ponderomotive barriers*, International Conference on Plasma Science ICOPS 2006, Traverse City, MI, Jun 4-8, 2006; IEEE Conference Record - Abstracts, p. 203.
7. *Nonadiabatic ponderomotive barriers*, Sherwood Fusion Theory Conference (held in conjunction with APS April Meeting 2006), Dallas, TX, Apr 22-25, 2006; Bulletin of the American Physical Society 51 (2), 218 (2006).
8. Invited seminars at:
 - University of Wisconsin - Madison (02/20/2006),
 - Princeton Plasma Physics Laboratory (01/26/2006),
 - Courant Institute of Mathematical Sciences, New York University (11/16/2005).

CONTRIBUTED PRESENTATIONS

Nineteen contributed talks and posters (1999-2008); see <http://www.princeton.edu/~idodin/>.

LIST OF PUBLICATIONS

- [P1] V. I. Geyko, I. Y. Dodin, N. J. Fisch, and G. M. Fraiman, *Supra-bubble regime for laser acceleration of cold electron beams in tenuous plasma*, submitted to Phys. Plasmas.
- [P2] A. I. Zhmoginov, I. Y. Dodin, and N. J. Fisch, *Negative effective mass of wave-driven classical particles in dielectric media*, submitted to Phys. Rev. E.
- [P3] I. Y. Dodin, V. I. Geyko, and N. J. Fisch, *Langmuir wave linear evolution in inhomogeneous nonstationary anisotropic plasma*, Phys. Plasmas **16**, 112101 (2009).
- [P4] V. I. Geyko, G. M. Fraiman, I. Y. Dodin, and N. J. Fisch, *Ponderomotive acceleration of hot electrons in tenuous plasmas*, Phys. Rev. E **80**, 036404 (2009).
- [P5] I. Y. Dodin and N. J. Fisch, *Dressed-particle approach in the nonrelativistic classical limit*, Phys. Rev. E **79**, 026407 (2009).

- [P6] I. Y. Dodin and N. J. Fisch, *Non-Newtonian mechanics of oscillation centers*, AIP Proc. **1061**, 263 (2008), or in *Frontiers in Modern Plasma Physics* (AIP, New York, 2008).
- [P7] I. Y. Dodin and N. J. Fisch, *Charged particle acceleration in dense plasma channels*, Phys. Plasmas **15**, 103105 (2008).
- [P8] I. Y. Dodin and N. J. Fisch, *Diffusion paths in resonantly driven Hamiltonian systems*, Phys. Lett. A **372**, 6112 (2008).
- [P9] I. Y. Dodin, A. I. Zhmoginov, and N. J. Fisch, *Manley-Rowe relations for an arbitrary discrete system*, Phys. Lett. A **372**, 6094 (2008).
- [P10] I. Y. Dodin and N. J. Fisch, *Positive and negative effective mass of classical particles in oscillatory and static fields*, Phys. Rev. E **77**, 036402 (2008).
- [P11] I. Y. Dodin and N. J. Fisch, *Stochastic extraction of periodic attosecond bunches from relativistic electron beams*, Phys. Rev. Lett. **98**, 234801 (2007).
- [P12] I. Y. Dodin and N. J. Fisch, *Particle manipulation with nonadiabatic ponderomotive forces*, Phys. Plasmas **14**, 055901 (2007).
- [P13] I. Y. Dodin and N. J. Fisch, *Nonadiabatic tunneling in ponderomotive barriers*, Phys. Rev. E **74**, 056404 (2006).
- [P14] I. Y. Dodin and N. J. Fisch, *Correction to the Alfvén-Lawson criterion for relativistic electron beams*, Phys. Plasmas **13**, 103104 (2006).
- [P15] I. Y. Dodin and N. J. Fisch, *Nonadiabatic ponderomotive potentials*, Phys. Lett. A **349**, 356 (2006).
- [P16] I. Y. Dodin and N. J. Fisch, *Ponderomotive ratchet in a uniform magnetic field*, Phys. Rev. E **72**, 046602 (2005).
- [P17] I. Y. Dodin and N. J. Fisch, *Quantumlike dynamics of classical particles in ponderomotive potentials*, Phys. Rev. Lett. **95**, 115001 (2005).
- [P18] I. Y. Dodin and N. J. Fisch, *Variational formulation of the Gardner's restacking algorithm*, Phys. Lett. A **341**, 187 (2005).
- [P19] I. Y. Dodin and N. J. Fisch, *Approximate integrals of radiofrequency-driven particle motion in magnetic field*, J. Plasma Phys. **71**, 289 (2005).
- [P20] I. Y. Dodin, N. J. Fisch, and J. M. Rax, *Ponderomotive barrier as a Maxwell demon*, Phys. Plasmas **11**, 5046 (2004).
- [P21] I. Y. Dodin and N. J. Fisch, *Relativistic electron acceleration in focused laser fields after above-threshold ionization*, Phys. Rev. E **68**, 056402 (2003).
- [P22] N. J. Fisch, J. M. Rax, and I. Y. Dodin, *Current drive in a ponderomotive potential with sign reversal*, Phys. Rev. Lett. **91**, 205004 (2003), *ibid* **93**, 059902(E) (2004).
- [P23] I. Y. Dodin, N. J. Fisch, and G. M. Fraiman, *Drift Lagrangian for relativistic particle in intense laser field*, Pis'ma Zh. Eksp. Teor. Fiz. **78**, 238 (2003) [JETP Lett. **78**, 202 (2003)].
- [P24] I. Y. Dodin and N. J. Fisch, *Dynamic volume holography and optical information processing by Raman scattering*, Opt. Comm. **214**, 83 (2002).
- [P25] I. Y. Dodin, G. M. Fraiman, V. M. Malkin, and N. J. Fisch, *Amplification of short laser pulses by Raman backscattering in capillary plasmas*, Zh. Eksp. Teor. Fiz. **122**, 723 (2002) [JETP **95**, 625 (2002)].
- [P26] I. E. Dodin and G. M. Fraiman, *Short laser pulses amplification in oversized dielectric capillary plasmas*, Priklad. Fizika **5**, 28 (2002).

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- [P27] I. Y. Dodin and N. J. Fisch, *Storing, retrieving, and processing optical information by Raman backscattering in plasmas*, Phys. Rev. Lett. **88**, 165001 (2002).
- [P28] I. Y. Dodin and N. J. Fisch, *Alfvén wave tomography for cold magnetohydrodynamic plasmas*, Phys. Plasmas **9**, 760 (2002).
- [P29] I. Y. Dodin and N. J. Fisch, *Motion of charged particles near magnetic-field discontinuities*, Phys. Rev. E **64**, 016405 (2001).
- [P30] V. L. Bratman, I. E. Dodin, and D. A. Lukovnikov, *To the problem of single-mode operation in Smith-Purcell FEM*, Intl. J. Infrared Millimeter Waves **20**, 991 (1999).