

ILYA Y. DODIN

Curriculum Vitae

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



**PRINCETON UNIVERSITY**

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**PROFESSIONAL BACKGROUND**

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

*Research interests:* nonlinear dynamics, Hamiltonian systems, phase space engineering, basic plasma physics, ponderomotive forces, laser- and microwave-plasma interaction, microwave electronics.

**APPOINTMENTS**

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since 11/2007	<b>Associate Research Scholar</b> PRINCETON UNIVERSITY
07/2005-11/2007	<b>Postdoctoral Research Associate</b> PRINCETON UNIVERSITY

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**EDUCATION**

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

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**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**

- 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.

**CONTRIBUTED PRESENTATIONS**

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

**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).

**LIST OF PUBLICATIONS**

- [P1] I. Y. Dodin, V. I. Geyko, and N. J. Fisch, *Langmuir wave linear evolution in inhomogeneous nonstationary anisotropic plasma*, Phys. Plasmas **16**, 112101 (2009).
- [P2] 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).
- [P3] I. Y. Dodin and N. J. Fisch, *Dressed-particle approach in the nonrelativistic classical limit*, Phys. Rev. E **79**, 026407 (2009).
- [P4] 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).
- [P5] I. Y. Dodin and N. J. Fisch, *Charged particle acceleration in dense plasma channels*, Phys. Plasmas **15**, 103105 (2008).
- [P6] I. Y. Dodin and N. J. Fisch, *Diffusion paths in resonantly driven Hamiltonian systems*, Phys. Lett. A **372**, 6112 (2008).
- [P7] I. Y. Dodin, A. I. Zhmoginov, and N. J. Fisch, *Manley-Rowe relations for an arbitrary discrete system*, Phys. Lett. A **372**, 6094 (2008).
- [P8] 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).

- [P9] I. Y. Dodin and N. J. Fisch, *Stochastic extraction of periodic attosecond bunches from relativistic electron beams*, Phys. Rev. Lett. **98**, 234801 (2007).
- [P10] I. Y. Dodin and N. J. Fisch, *Particle manipulation with nonadiabatic ponderomotive forces*, Phys. Plasmas **14**, 055901 (2007).
- [P11] I. Y. Dodin and N. J. Fisch, *Nonadiabatic tunneling in ponderomotive barriers*, Phys. Rev. E **74**, 056404 (2006).
- [P12] I. Y. Dodin and N. J. Fisch, *Correction to the Alfvén-Lawson criterion for relativistic electron beams*, Phys. Plasmas **13**, 103104 (2006).
- [P13] I. Y. Dodin and N. J. Fisch, *Nonadiabatic ponderomotive potentials*, Phys. Lett. A **349**, 356 (2006).
- [P14] I. Y. Dodin and N. J. Fisch, *Ponderomotive ratchet in a uniform magnetic field*, Phys. Rev. E **72**, 046602 (2005).
- [P15] I. Y. Dodin and N. J. Fisch, *Quantumlike dynamics of classical particles in ponderomotive potentials*, Phys. Rev. Lett. **95**, 115001 (2005).
- [P16] I. Y. Dodin and N. J. Fisch, *Variational formulation of the Gardner’s restacking algorithm*, Phys. Lett. A **341**, 187 (2005).
- [P17] I. Y. Dodin and N. J. Fisch, *Approximate integrals of radiofrequency-driven particle motion in magnetic field*, J. Plasma Phys. **71**, 289 (2005).
- [P18] I. Y. Dodin, N. J. Fisch, and J. M. Rax, *Ponderomotive barrier as a Maxwell demon*, Phys. Plasmas **11**, 5046 (2004).
- [P19] I. Y. Dodin and N. J. Fisch, *Relativistic electron acceleration in focused laser fields after above-threshold ionization*, Phys. Rev. E **68**, 056402 (2003).
- [P20] 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).
- [P21] 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)].
- [P22] I. Y. Dodin and N. J. Fisch, *Dynamic volume holography and optical information processing by Raman scattering*, Opt. Comm. **214**, 83 (2002).
- [P23] 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)].
- [P24] I. E. Dodin and G. M. Fraiman, *Short laser pulses amplification in oversized dielectric capillary plasmas*, Priklad. Fizika **5**, 28 (2002).
- [P25] I. Y. Dodin and N. J. Fisch, *Storing, retrieving, and processing optical information by Raman backscattering in plasmas*, Phys. Rev. Lett. **88**, 165001 (2002).
- [P26] I. Y. Dodin and N. J. Fisch, *Alfvén wave tomography for cold magnetohydrodynamic plasmas*, Phys. Plasmas **9**, 760 (2002).
- [P27] I. Y. Dodin and N. J. Fisch, *Motion of charged particles near magnetic-field discontinuities*, Phys. Rev. E **64**, 016405 (2001).
- [P28] 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).