

Curriculum Vitae

Ilya Dodin

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EDUCATION

PhD (2005), MA (2001) <i>in plasma physics</i>	Princeton University Department of Astrophysical Sciences
BS (1998), MS (2000) <i>in physics</i>	Nizhniy Novgorod State University Nizhniy Novgorod, Russia

RESEARCH APPOINTMENTS

since 01/2020	Principal Research Physicist Princeton Plasma Physics Laboratory
10/2015-12/2019	Research Physicist Princeton Plasma Physics Laboratory
11/2011-09/2015	Staff Research Physicist Princeton Plasma Physics Laboratory
11/2007-10/2011	Associate Research Scholar Princeton University
07/2005-11/2007	Postdoctoral Research Associate Princeton University

TEACHING APPOINTMENTS

since 02/2020	Lecturer with the Rank of Professor Department of Astrophysical Sciences, Princeton University
09/2009-02/2020	Lecturer Department of Astrophysical Sciences, Princeton University

VISITING APPOINTMENTS

06/2017-07/2017	Visiting Associate Professor National Institute for Fusion Science, Japan
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RESEARCH INTERESTS

Basic plasma theory, wave theory and geometrical optics, radiofrequency waves, turbulence, laser-plasma interactions, ponderomotive effects, quantum-classical analogies, Hamiltonian mechanics.

AWARDS AND FELLOWSHIPS

- **Outstanding Referee of Physical Review**, 2025.
- **Thomas H. Stix Award** for Outstanding Early Career Contributions to Plasma Physics Research, American Physical Society, 2014.
- **Young Scientist Prize** in Plasma Physics, International Union of Pure and Applied Physics, 2011.
- **Harold W. Dodds Fellowship**, Princeton University, academic year 2003-2004.
- **First Prize**, 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.

SYNERGISTIC ACTIVITIES

- **Co-chair**, Selection Committee for the APS DPP John Dawson Award for Excellence in Plasma Physics Research (2025).
- **Session Chair**, PPPL-IBM mini-workshop on quantum computing (Princeton, 2025).
- **Editorial Board Member**, Physical Review E (2019-2024).
- **Co-organizer**, Mini-conference on Plasma and Quantum Information Sciences, 65th Annual Meeting of the APS Division of Plasma Physics (2023).
- **Committee Member**, Selection Committee for the APS DPP John Dawson Award for Excellence in Plasma Physics Research (2023).
- **Co-organizer**, workshop *Working Across Scales in Complex Systems* (Atlanta, 2023).
- **Session Chair**, APS DPP Annual Meetings (2019, 2016, 2008).
- **Associate Editor**, Journal of Plasma Physics (2016-2017).
- **Chair of the Organizing Committee**, symposium *Solved and Unsolved Problems in Plasma Physics* (Princeton, 2016).
- **Committee Member**, Selection Committee for the 2015 APS Thomas H. Stix Award.
- **Lecturer**, National Undergraduate Fellowship Program (2011-2014).
- **Reviewer**, multiple journals and U.S. federal funding agencies.

PH.D. STUDENTS

- **Suying Jin**, *Modulational stability of magnetohydrodynamic turbulence*, Ph.D. thesis (Princeton University, 2025), <http://arks.princeton.edu/ark:/88435/dsp01qb98mj90w>.
- **Deepen Garg**, *Dispersive gravitational waves in gases and plasmas*, Ph.D. thesis (Princeton University, 2023), <http://arks.princeton.edu/ark:/88435/dsp01g732dd29j>
- **Nicolas A. Lopez**, *Metaplectic geometrical optics*, Ph.D. thesis (Princeton University, 2022), <http://arks.princeton.edu/ark:/88435/dsp01bc386n43w>.
- **Hongxuan Zhu**, *Phase-space theory of drift wave–zonal flow interactions and the Dimits shift*, Ph.D. thesis (Princeton University, 2020), <http://arks.princeton.edu/ark:/88435/dsp01dv13zx27n>.
- **Daniel E. Ruiz**, *A geometric theory of waves and its applications to plasma physics*, Ph.D. thesis (Princeton University, 2017), <http://arks.princeton.edu/ark:/88435/dsp01k930c068w>.

INVITED TALKS, EXTERNAL SEMINARS, AND COLLOQUIA

1. *Quantum algorithms for modeling waves in plasmas*, Seminar, A*STAR, Aug 8, 2025; Singapore.
2. *Metaplectic geometrical optics*, Seminar, A*STAR, Aug 7, 2025; Singapore.
3. *Drift-wave turbulence as quantumlike plasma*, Seminar, Nanyang Technological University, Aug 6, 2025; Singapore.
4. *Quantum algorithms for modeling waves in plasmas*, Satellite Meeting, 51st EPS Conference on Plasma Physics, Jul 12, 2025; Vilnius, Lithuania.
5. *Application of Weyl symbol calculus for quasilinear modeling of waves in plasmas*, 51st Annual National Radio Science Meeting, Jan 7-10, 2025; Boulder, CO.
6. *Phase-space methods for modeling waves*, Interconnections between the Physics of Plasmas and Self-gravitating Systems, KITP, UCSB, Jul 23, 2024.
7. *Quantum computing for plasma physics: state of the art and potential opportunities*, Plenary Talk, 3rd International Fusion and Plasma Conference (iFPC-2024), Jun 24-28, 2024.
8. *Quasilinear theory, collisions, and ponderomotive forces: a unification for general plasmas and beyond*, Plenary Talk, PL-27, 6th Asia Pacific Conference on Plasma Physics (AAPPS-DPP-2022), Oct 9-14, 2022.
9. *Waves in plasmas: is ray optics really limited to short wavelengths?*, Seminar (online), A*STAR, Singapore, Sep 20, 2022.
10. *Quasilinear theory: incorporating plasma inhomogeneity and collisions from first principles*, Invited Talk, 13th Plasma Kinetics Working Meeting, Vienna, Austria, Jul 25–Aug 5, 2022.
11. *Modern wave theory with applications to radiofrequency waves in plasma*, Review Talk (plenary), YR01.001, 63rd Annual Meeting of the APS Division of Plasma Physics, Pittsburgh, PA, Nov 8–12, 2021.
12. *Applications of modern geometrical optics to modeling radiofrequency waves and plasma turbulence*, Journal of Plasma Physics Frontiers of Plasma Physics Colloquium (online), Oct 28, 2021.
13. *Does quantum computing look promising for plasma simulations?*, Seminar (online), Instituto Superior Técnico, Lisbon, Portugal, Dec 18, 2020.

14. *Plasma physics of waves and turbulence*, Seminar (online), UC Berkeley, Oct 16, 2020.
15. *Theory of mode-converting quasioptical wave beams in inhomogeneous plasma*, Invited Talk, US–Japan Workshop on RF Heating Physics, Princeton, NJ, Sep 4–6, 2019.
16. *Cross-scale interactions and the Dimits shift in reduced models of drift-wave turbulence*, Invited Talk, 12th Plasma Kinetics Working Meeting, Vienna, Austria, Jul 29 – Aug 9, 2019.
17. *Modeling drift-wave turbulence as quantumlike plasma*, Invited Talk, 46th EPS Conference on Plasma Physics, Milan, Italy, Jul 8–12, 2019.
18. *Understanding the dynamics of zonal flows through quantumlike modeling of drift-wave turbulence*, Plasma Physics Seminar, University of Maryland, Jun 12, 2019.
19. *Structure from turbulence*, Theoretical Physics Colloquium, University of Oxford, Oxford, UK, May 3, 2019.
20. *Quantumlike modeling of drift-wave turbulence: recent updates*, Plasma Theory Group Seminar, University of Oxford, Oxford, UK, May 2, 2019.
21. *Mode-converting wave beams can be simulated without full-wave codes*, Invited Talk, Sherwood Fusion Theory Conference, Princeton, NJ, Apr 15–17, 2019.
22. *Structure from turbulence, or why you might want to care about plasma physics even if you are not a plasma physicist*, Invited Seminar, Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Potsdam, Germany, Mar 28, 2019.
23. *Inhomogeneous drift-wave turbulence as an effective quantum plasma*, Invited Talk, 11th Plasma Kinetics Working Meeting, Vienna, Austria, Jul 23 – Aug 3, 2018.
24. *Inhomogeneous wave turbulence as an effective quantum plasma: a study of zonal flows*, Invited Talk, SIAM Conference on Nonlinear Waves and Coherent Structures, Orange, CA, Jun 11–14, 2018.
25. *Does a photon have a linear polarizability and why does it matter?*, Magneto-Fluid Dynamics Seminar, CIMS, NYU, Oct 10, 2017.
26. *Quantumlike physics in classical plasmas*, Physics Colloquium, University of Massachusetts Boston, Sep 24, 2015.
27. *Modernizing and advancing the understanding of plasma waves: field-theoretical paradigm*, Invited Talk, Online Town Hall Meeting on Theory and Computation, Frontiers of Plasma Science Workshop series, Aug 5, 2015.
28. *The ponderomotive effect beyond the ponderomotive force*, Invited Talk, 56th Annual Meeting of the APS Division of Plasma Physics, New Orleans, LA, Oct 27–31, 2014.
29. *Nonlinear plasma waves with trapped particles: variational theory and simulations*, Invited Talk, 5th International Conference “Frontiers of Nonlinear Physics”, Nizhny Novgorod, Russia, Jul 28 – Aug 2, 2013.
30. *Lagrangian and geometrical methods in the fundamental physics of waves and their application to plasma dynamics*, Invited Talk, 6th ITER International School on RF Heating and Current Drive in Plasmas, Ahmedabad, India, Dec 2–6, 2012.
31. *Quantum physics of classical waves in plasma*, Invited Talk, 54th Annual Meeting of the APS Division of Plasma Physics, Providence, RI, Oct 29 – Nov 2, 2012.
32. *Axiomatic approach to wave-particle interactions and its applications to waves with trapped particles*, Invited Talk, Sherwood Fusion Theory Conference (held in conjunction with the APS April Meeting), Atlanta, GA, Mar 30 – Apr 3, 2012.

33. *Ponderomotive forces and wave dispersion: two sides of the same coin*, Invited Talk, 30th International Conference on the Phenomena in Ionized Gases, Belfast, UK, Aug 28 – Sep 2, 2011.
34. *Nonlinear dispersion and conservation theorems for adiabatic waves in collisionless plasmas*, Invited Talk, 3rd International Conference on High Energy Density Physics, Lisbon, Portugal, May 17–20, 2011.
35. *Compressing linear waves trapped in plasma*, Invited Talk, 40th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, Jan 3–7, 2010.
36. *Non-Newtonian mechanics and manipulation of oscillation centers*, Invited Talk, International Workshop on the Frontiers of Modern Plasma Physics, ICTP, Trieste, Italy, Jul 14–25, 2008.
37. *Classical analogues of atom manipulation techniques using laser radiation*, Invited Talk, International Workshop on Quantum Reflection, ITAMP, Harvard University, Cambridge, MA, Oct 21–24, 2007.
38. *Particle manipulation with nonadiabatic ponderomotive forces*, Invited Talk, 15th International Conference on Atomic Processes in Plasmas, Gaithersburg, MD, Mar 19–22, 2007.
39. *Manipulating the particle phase space with nonadiabatic ponderomotive barriers*, Invited Talk, 47th Annual Meeting of the APS Division of Plasma Physics, Philadelphia, PA, Oct 30 – Nov 3, 2006.
40. *Precise manipulations of the particle phase space with nonadiabatic ponderomotive barriers*, Invited Talk, Attosecond Science Workshop, Santa Barbara, CA, Jul 31 – Sep 15, 2006.
41. *Nonadiabatic ponderomotive barriers*, Invited Talk, International Conference on Plasma Science ICOPS 2006, Traverse City, MI, Jun 4–8, 2006.
42. *Nonadiabatic ponderomotive barriers*, Invited Talk, Sherwood Fusion Theory Conference (held in conjunction with the APS April Meeting), Dallas, TX, Apr 22–25, 2006.

REFEREED PUBLICATIONS

1. I. Y. Dodin, N. A. Lopez, T. Xing, R. H. Marholt, and V. H. Hall-Chen, *Geometrical optics in phase space*, arXiv:2509.08098, under review, <https://doi.org/10.48550/arXiv.2509.08098>.
2. N. Bohlsen, I. Y. Dodin, H. Qin, *Counting topological interface modes using simplicial characteristic classes*, arXiv:2508.01063, under review, <https://doi.org/10.48550/arXiv.2508.01063>.
3. S. Jin and I. Y. Dodin, *Mean-field dynamo as a quantumlike modulational instability*, *J. Plasma Phys.* **91**, E111 (2025), <https://doi.org/10.1017/S0022377825100561>.
4. S. Jin and I. Y. Dodin, *On reduced modeling of the modulational dynamics in magnetohydrodynamics*, *J. Plasma Phys.* **91**, E43 (2025), <https://doi.org/10.1017/S0022377824001302>.
5. I. Y. Dodin, *Quasilinear theory: the lost ponderomotive effects and why they matter*, *Rev. Mod. Plasma Phys.* **8**, 35 (2024), <https://doi.org/10.1007/s41614-024-00173-4>.
6. I. Novikau, I. Y. Dodin, and E. A. Startsev, *Encoding of linear kinetic plasma problems in quantum circuits via data compression*, *J. Plasma Phys.* **90**, 805900401 (2024), <https://doi.org/10.1017/s0022377824000795>.
7. D. Garg and I. Y. Dodin, *Self-consistent interaction of linear gravitational and electromagnetic waves in non-magnetized plasma*, *J. Cosmol. Astropart. Phys.* **2024**, 045 (2024), <https://doi.org/10.1088/1475-7516/2024/02/045>.
8. D. Garg and I. Y. Dodin, *Gauge-invariant gravitational waves in matter beyond linearized gravity*, *Classical and Quantum Gravity* **40**, 215002 (2023), <https://doi.org/10.1088/1361-6382/acfc0e>.

9. Y. Fu, I. Y. Dodin, and H. Qin, *Spin Hall effect of radiofrequency waves in magnetized plasmas*, Phys. Rev. E **107**, 055210 (2023), <https://doi.org/10.1103/PhysRevE.107.055210>.
10. I. Novikau, I. Y. Dodin, and E. A. Startsev, *Simulation of linear non-Hermitian boundary-value problems with quantum singular-value transformation*, Phys. Rev. Appl. **19**, 054012 (2023), <https://doi.org/10.1103/physrevapplied.19.054012>.
11. D. Garg and I. Y. Dodin, *Gauge invariants of linearized gravity with a general background metric*, Class. Quantum Gravity **39**, 245003 (2022), <https://doi.org/10.1088/1361-6382/aca067>.
12. D. Garg and I. Y. Dodin, *Gravitational wave modes in matter*, J. Cosmol. Astropart. Phys. **2022**, 017 (2022), <https://doi.org/10.1088/1475-7516/2022/08/017>.
13. I. Y. Dodin, *Quasilinear theory for inhomogeneous plasma*, J. Plasma Phys. **88**, 905880407 (2022), <https://doi.org/10.1017/S0022377822000502>.
14. I. Novikau, E. A. Startsev, and I. Y. Dodin, *Quantum signal processing for simulating cold plasma waves*, Phys. Rev. A **105**, 062444 (2022), <https://doi.org/10.1103/physreva.105.062444>.
15. N. A. Lopez and I. Y. Dodin, *Metaplectic geometrical optics for ray-based modeling of caustics: theory and algorithms*, Phys. Plasmas **29**, 052111 (2022), <https://doi.org/10.1063/5.0082241>.
16. K. Yanagihara, I. Y. Dodin, and S. Kubo, *Quasioptical modeling of wave beams with and without mode conversion. IV. Numerical simulations of waves in dissipative media*, Phys. Plasmas **28**, 122102 (2021), <https://doi.org/10.1063/5.0057345>.
17. K. Yanagihara, S. Kubo, I. Y. Dodin, and the LHD Experiment Group, *Quasioptical propagation and absorption of electron cyclotron waves: simulations and experiment*, Nucl. Fusion **61**, 106012 (2021), <https://doi.org/10.1088/1741-4326/ac1d86>.
18. I. Y. Dodin and E. A. Startsev, *On applications of quantum computing to plasma simulations*, Phys. Plasmas **28**, 092101 (2021), <https://doi.org/10.1063/5.0056974>.
19. S. M. Donnelly, N. A. Lopez, and I. Y. Dodin, *Steepest-descent algorithm for simulating plasma-wave caustics via metaplectic geometrical optics*, Phys. Rev. E **104**, 025304 (2021), <https://doi.org/10.1103/physreve.104.025304>.
20. N. A. Lopez and I. Y. Dodin, *Exactly unitary discrete representations of the metaplectic transform for linear-time algorithms*, J. Opt. Soc. Am. A **38**, 634 (2021), <https://doi.org/10.1364/josaa.417412>.
21. H. Zhu and I. Y. Dodin, *Wave-kinetic approach to zonal-flow dynamics: recent advances*, Phys. Plasmas **28**, 032303 (2021), <https://doi.org/10.1063/5.0043784>.
22. N. A. Lopez and I. Y. Dodin, *Metaplectic geometrical optics for modeling caustics in uniform and nonuniform media*, J. Opt. **23**, 025601 (2021), <https://doi.org/10.1088/2040-8986/abd1ce>.
23. D. Garg and I. Y. Dodin, *Average nonlinear dynamics of particles in gravitational pulses: effective Hamiltonian, secular acceleration, and gravitational susceptibility*, Phys. Rev. D **102**, 064012 (2020), <https://doi.org/10.1103/physrevd.102.064012>.
24. N. A. Lopez and I. Y. Dodin, *Restoring geometrical optics near caustics using sequenced metaplectic transforms*, New J. Phys. **22**, 083078 (2020), <https://doi.org/10.1088/1367-2630/aba91a>.
25. H. Zhu, Y. Zhou, and I. Y. Dodin, *Theory of the tertiary instability and the Dimits shift within a scalar model*, J. Plasma Phys. **86**, 905860405 (2020), <https://doi.org/10.1017/S0022377820000823>.
26. M. A. Oancea, J. Joudioux, I. Y. Dodin, D. E. Ruiz, C. F. Paganini, and L. Andersson, *Gravitational spin Hall effect of light*, Phys. Rev. D **102**, 024075 (2020), <https://doi.org/10.1103/PhysRevD.102.024075>.

27. V. Tsiolis, Y. Zhou, and I. Y. Dodin, *Structure formation in turbulence as an instability of effective quantum plasma*, Phys. Lett. A **384**, 126377 (2020), <https://doi.org/10.1016/j.physleta.2020.126377>.
28. Y. Zhou, H. Zhu, and I. Y. Dodin, *Solitary zonal structures in subcritical drift waves: a minimum model*, Plasma Phys. Control. Fusion **62**, 045021 (2020), <https://doi.org/10.1088/1361-6587/ab78f3>.
29. H. Zhu, Y. Zhou, and I. Y. Dodin, *Theory of the tertiary instability and the Dimits shift from reduced drift-wave models*, Phys. Rev. Lett. **124**, 055002 (2020), <https://doi.org/10.1103/PhysRevLett.124.055002>.
30. N. A. Lopez and I. Y. Dodin, *Pseudo-differential representation of the metaplectic transform and its application to fast algorithms*, J. Opt. Soc. Am. A **36**, 1846 (2019), <https://doi.org/10.1364/JOSAA.36.001846>.
31. K. Yanagihara, I. Y. Dodin, and S. Kubo, *Quasioptical modeling of wave beams with and without mode conversion. III. Numerical simulations of mode-converting beams*, Phys. Plasmas **26**, 072112 (2019), <https://doi.org/10.1063/1.5095174>.
32. K. Yanagihara, I. Y. Dodin, and S. Kubo, *Quasioptical modeling of wave beams with and without mode conversion. II. Numerical simulations of single-mode beams*, Phys. Plasmas **26**, 072111 (2019), <https://doi.org/10.1063/1.5095173>.
33. I. Y. Dodin, D. E. Ruiz, K. Yanagihara, Y. Zhou, and S. Kubo, *Quasioptical modeling of wave beams with and without mode conversion. I. Basic theory*, Phys. Plasmas **26**, 072110 (2019), <https://doi.org/10.1063/1.5095076>.
34. K. Yanagihara, S. Kubo, T. I. Tsujimura, and I. Y. Dodin, *Mode purity of electron cyclotron waves after their passage through the peripheral plasma in the Large Helical Device*, Plasma and Fusion Research **14**, 3403103 (2019), <https://doi.org/10.1585/pfr.14.3403103>.
35. H. Zhu, Y. Zhou, and I. Y. Dodin, *Nonlinear saturation and oscillations of collisionless zonal flows*, New J. Phys. **21**, 063009 (2019), <https://doi.org/10.1088/1367-2630/ab2251>.
36. Y. Zhou, H. Zhu, and I. Y. Dodin, *Formation of solitary zonal structures via the modulational instability of drift waves*, Plasma Phys. Controlled Fusion **61**, 075003 (2019), <https://doi.org/10.1088/1361-6587/ab16a8>.
37. D. E. Ruiz, M. E. Glinsky, and I. Y. Dodin, *Wave kinetic equation for inhomogeneous drift-wave turbulence beyond the quasilinear approximation*, J. Plasma Phys. **85**, 905850101 (2019), <https://doi.org/10.1017/S0022377818001307>.
38. H. Zhu, Y. Zhou, and I. Y. Dodin, *On the Rayleigh–Kuo criterion for the tertiary instability of zonal flows*, Phys. Plasmas **25**, 082121 (2018), <https://doi.org/10.1063/1.5038859>.
39. H. Zhu, Y. Zhou, and I. Y. Dodin, *On the structure of the drifton phase space and its relation to the Rayleigh–Kuo criterion of the zonal-flow stability*, Phys. Plasmas **25**, 072121 (2018), <https://doi.org/10.1063/1.5039652>.
40. H. Zhu, Y. Zhou, D. E. Ruiz, and I. Y. Dodin, *Wave kinetics of drift-wave turbulence and zonal flows beyond the ray approximation*, Phys. Rev. E **97**, 053210 (2018), <https://doi.org/10.1103/PhysRevE.97.053210>.
41. I. Y. Dodin, D. E. Ruiz, and S. Kubo, *Mode conversion in cold low-density plasma with a sheared magnetic field*, Phys. Plasmas **24**, 122116 (2017), <https://doi.org/10.1063/1.5003931>.
42. A. V. Arefiev, I. Y. Dodin, A. Kohn, E. J. Du Toit, E. Holzauer, V. F. Shevchenko, and R. G. L. Vann, *Kinetic simulations of X–B and O–X–B mode conversion and its deterioration at high input power*, Nucl. Fusion **57**, 116024 (2017), <https://doi.org/10.1088/1741-4326/aa7e43>.

43. K. Hara, I. Barth, E. Kaminski, I. Y. Dodin, and N. J. Fisch, *Kinetic simulations of ladder climbing by electron plasma waves*, Phys. Rev. E **95**, 053212 (2017), <https://doi.org/10.1103/PhysRevE.95.053212>.
44. I. Y. Dodin and A. V. Arefiev, *Parametric decay of plasma waves near the upper-hybrid resonance*, Phys. Plasmas **24**, 032119 (2017), <https://doi.org/10.1063/1.4979168>.
45. I. Y. Dodin, A. I. Zhmoginov, and D. E. Ruiz, *Variational principles for dissipative (sub)systems, with applications to the theory of linear dispersion and geometrical optics*, Phys. Lett. A **381**, 1411 (2017), <https://doi.org/10.1016/j.physleta.2017.02.023>.
46. D. E. Ruiz and I. Y. Dodin, *Extending geometrical optics: a Lagrangian theory for vector waves*, Phys. Plasmas **24**, 055704 (2017), <https://doi.org/10.1063/1.4977537>.
47. D. E. Ruiz and I. Y. Dodin, *Ponderomotive dynamics of waves in quasiperiodically modulated media*, Phys. Rev. A **95**, 032114 (2017), <https://doi.org/10.1103/PhysRevA.95.032114>.
48. I. Y. Dodin and D. E. Ruiz, *Photon polarizability and its effect on the dispersion of plasma waves*, J. Plasma Phys. **83**, 905830201 (2017), <https://doi.org/10.1017/S0022377817000198>.
49. D. E. Ruiz, J. B. Parker, E. L. Shi, and I. Y. Dodin, *Zonal-flow dynamics from a phase-space perspective*, Phys. Plasmas **23**, 122304 (2016), <https://doi.org/10.1063/1.4971813>.
50. A. A. Balakin, I. Y. Dodin, G. M. Fraiman, and N. J. Fisch, *Backward Raman amplification of broadband pulses*, Phys. Plasmas **23**, 083115 (2016), <https://doi.org/10.1063/1.4960835>.
51. D. E. Ruiz, C. L. Ellison, and I. Y. Dodin, *Relativistic ponderomotive Hamiltonian of a Dirac particle in a vacuum laser field*, Phys. Rev. A **92**, 062124 (2015), <https://doi.org/10.1103/PhysRevA.92.062124>.
52. D. E. Ruiz and I. Y. Dodin, *First-principles variational formulation of polarization effects in geometrical optics*, Phys. Rev. A **92**, 043805 (2015), <https://doi.org/10.1103/PhysRevA.92.043805>.
53. D. E. Ruiz and I. Y. Dodin, *On the correspondence between quantum and classical variational principles*, Phys. Lett. A **379**, 2623 (2015), <https://doi.org/10.1016/j.physleta.2015.06.014>.
54. C. Liu and I. Y. Dodin, *Nonlinear frequency shift of electrostatic waves in general collisionless plasma: unifying theory of fluid and kinetic nonlinearities*, Phys. Plasmas **22**, 082117 (2015), <https://doi.org/10.1063/1.4928585>.
55. D. E. Ruiz and I. Y. Dodin, *Lagrangian geometrical optics of nonadiabatic vector waves and spin particles*, Phys. Lett. A **379**, 2337 (2015), <https://doi.org/10.1016/j.physleta.2015.07.038>.
56. I. Barth, I. Y. Dodin, and N. J. Fisch, *Ladder climbing and autoresonant acceleration of plasma waves*, Phys. Rev. Lett. **115**, 075001 (2015), <https://doi.org/10.1103/PhysRevLett.115.075001>.
57. A. A. Balakin, G. M. Fraiman, and I. Y. Dodin, *Two-stage Raman compression of laser pulses with controllable phase fronts*, Phys. Plasmas **22**, 053112 (2015), <https://doi.org/10.1063/1.4921654>.
58. I. Y. Dodin, *Comment on "Formation of phase space holes and clumps"*, Phys. Rev. Lett. **113**, 179501 (2014), <https://doi.org/10.1103/PhysRevLett.113.179501>.
59. I. Y. Dodin and N. J. Fisch, *Are perytons signatures of ball lightning?*, Ap. J. **794**, 98 (2014), <https://doi.org/10.1088/0004-637X/794/2/98>.
60. I. Y. Dodin and N. J. Fisch, *Ponderomotive forces on waves in modulated media*, Phys. Rev. Lett. **112**, 205002 (2014), <https://doi.org/10.1103/PhysRevLett.112.205002>.
61. I. Y. Dodin, *Geometric view on noneikonal waves*, Phys. Lett. A **378**, 1598 (2014), <https://doi.org/10.1016/j.physleta.2014.04.004>.
62. I. Y. Dodin and N. J. Fisch, *On the nature of kinetic electrostatic electron nonlinear (KEEN) waves*, Phys. Plasmas **21**, 034501 (2014), <https://doi.org/10.1063/1.4868230>.

63. I. Y. Dodin, *On variational methods in the physics of plasma waves*, Fusion Sci. Tech. **65**, 54 (2014), <https://doi.org/10.13182/FST13-641>.
64. X. Guan, I. Y. Dodin, H. Qin, J. Liu, and N. J. Fisch, *On plasma rotation induced by waves in tokamaks*, Phys. Plasmas **20**, 102105 (2013), <https://doi.org/10.1063/1.4823713>.
65. I. Y. Dodin, P. F. Schmit, J. Rocks, and N. J. Fisch, *Negative-mass instability in nonlinear plasma waves*, Phys. Rev. Lett. **110**, 215006 (2013), <https://doi.org/10.1103/PhysRevLett.110.215006>.
66. P. F. Schmit, I. Y. Dodin, J. Rocks, and N. J. Fisch, *Nonlinear amplification and decay of phase-mixed waves in compressing plasma*, Phys. Rev. Lett. **110**, 055001 (2013), <https://doi.org/10.1103/PhysRevLett.110.055001>.
67. I. Y. Dodin and N. J. Fisch, *Axiomatic geometrical optics, Abraham–Minkowski controversy, and photon properties derived classically*, Phys. Rev. A **86**, 053834 (2012), <https://doi.org/10.1103/PhysRevA.86.053834>.
68. I. Y. Dodin and N. J. Fisch, *Adiabatic nonlinear waves with trapped particles: III. Wave dynamics*, Phys. Plasmas **19**, 012104 (2012), <https://doi.org/10.1063/1.3673065>.
69. I. Y. Dodin and N. J. Fisch, *Adiabatic nonlinear waves with trapped particles: II. Wave dispersion*, Phys. Plasmas **19**, 012103 (2012), <https://doi.org/10.1063/1.3662115>.
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