Vadim Munirov

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Education

Princeton University — **Princeton, NJ**
Ph.D. in Astrophysical Sciences (Plasma Physics) — *Aug 2014 – Jul 2020*
Thesis title: Radiative Processes in Astrophysical and Laboratory Plasmas

University of California, San Diego — **La Jolla, CA**
Ph.D. student in Physics — *Sep 2013 – Jun 2014*

Moscow Institute of Physics and Technology — **Moscow, Russia**
M.Sc. in Applied Mathematics and Physics (with honors – 'red diploma') — *Sep 2011 – Jun 2013*
Thesis title: Investigation of Interaction of Nonuniformly Charged Macroparticles
B.Sc. in Applied Mathematics and Physics (with honors – 'red diploma') — *Sep 2007 – Jun 2011*

Research and Work Experience

Princeton University — **Princeton, NJ**
Visitor, Nathaniel Fisch's research group — *Oct 2022 – present*

- Developed Python code to optimize radiation losses from the proposed p-B11 fusion device
- Studied confinement of relativistic electrons in magnetic mirror using analytical theory and Fokker–Planck simulations

University of California, Berkeley — **Berkeley, CA**
Postdoctoral Scholar, Professor Jonathan Wurtele's research group — *Aug 2020 – Sep 2022*

- Analytically and numerically demonstrated how to create space-time quasicrystals in plasma by autoresonantly exciting multiphase ion-acoustic and plasma waves
- Developed and implemented ionization model for molecules, worked on parts of the code for modeling plasma grating experiments
- Supervised research projects for undergraduate students

Princeton Plasma Physics Laboratory — **Princeton, NJ**
Research Assistant, Advisor: Nathaniel Fisch — *Aug 2014 – Jul 2020*

- Quantified influence of kinetic effects on magnetic field generation in astrophysical plasmas due to radiative interaction
- Investigated the current drive and recoil effects in Bremsstrahlung absorption
- Quantified influence of plasma on cosmic microwave background (CMB)
- Developed Lyα Monte Carlo radiative transfer Python code with finite correlation length turbulence

Princeton University — **Princeton, NJ**
Teaching Assistant — *Sep 2016/18 – Jan 2017/19*

- Teaching assistant for a graduate course on "Plasma Waves and Instabilities"

University of California, San Diego — **La Jolla, CA**
Teaching Assistant — *Sep 2013 – Jun 2014*

- Coordinated 20-30 undergraduate students in a physics lab; tutored semi-individually

Troitsk Institute for Innovation and Fusion Research — **Moscow, Russia**
Research Assistant, Advisor: Anatoly Filippov — *Sep 2010 – Jun 2013*

- Analytically and numerically studied interaction of dielectric macroparticles in plasma as part of Master's and Bachelor's theses while studying at Moscow Institute of Physics and Technology

Publications

[1] **V.R. Munirov**, L. Friedland, J.S. Wurtele, *Multiphase nonlinear electron plasma waves*, Phys. Rev. E 106, 055201 (2022)

[2] **V.R. Munirov**, L. Friedland, J.S. Wurtele, *Autoresonant excitation of space-time quasicrystals in plasma*, Phys. Rev. Research 4, 023150 (2022), (Editors' Suggestion), (Featured in Physics)

[3] **V.R. Munirov**, N.J. Fisch, *Radiation in equilibrium with plasma and plasma effects on cosmic microwave background*, Phys. Rev. E, 100, 023202 (2019)

[4] **V.R. Munirov**, N.J. Fisch, *Inverse Bremsstrahlung current drive*, Phys. Rev. E, 96, 053211 (2017), (Editors' Suggestion)

[5] **V.R. Munirov**, N.J. Fisch, *Radiative transfer dynamo effect*, Phys. Rev. E, 95, 013205 (2017)

[6] **V.R. Munirov**, A.V. Filippov, *Interaction of two dielectric macroparticles*, J. Exp. Theor. Phys., 117, 809-819 (2013)

[7] **V.R. Munirov**, A.V. Filippov, *Interaction of a dielectric macroparticle with a point charge in plasma*, J. Exp. Theor. Phys., 115, 527-534 (2012)

[8] **V.R. Munirov**, N.J. Fisch, *Suppression of Bremsstrahlung losses from relativistic plasma with energy cutoff*, arXiv:2304.01476, submitted to Phys. Rev. E (2023)

[9] **V.R. Munirov**, A.A. Kaurov, *Influence of turbulence on Lyman-alpha scattering*, arXiv:2208.13103, submitted to MNRAS (2022)

[10] M.E. Mlodik, **V.R. Munirov**, *et al.*, *Sensitivity of synchrotron radiation to the superthermal electron population in mildly relativistic plasma*, Phys. Plasmas 30, 043301 (2023)

[11] M.R. Edwards, **V.R. Munirov**, *et al.*, *Holographic plasma lenses*, Phys. Rev. Lett., 128, 065003 (2022), (Featured in Physics)

[12] I.E. Ochs, **V.R. Munirov**, N.J. Fisch, *Confinement time and ambipolar potential in a relativistic mirror-confined plasma*, arXiv:2302.12346, submitted to Phys. Plasmas (2023)

Talks/Conferences/Visits

- *2023 ARPA-E Energy Innovation Summit*. National Harbor, MD, Mar 22–24, 2023
- *64th Annual Meeting of the APS Division of Plasma Physics*. Spokane, WA, Oct 17–21, 2022
- *Journal Club of LULI, CNRS, CEA, Sorbonne Université, École Polytechnique*. Paris, France (over zoom), Sep 28, 2022
- *Hebrew University of Jerusalem, Racah Institute of Physics*. Jerusalem, Israel, May 10–Jun 10 and Sep 7–25, 2022
- *63rd Annual Meeting of the APS Division of Plasma Physics*. Pittsburgh, PA, Nov 8–12, 2021
- *CLEO: QELS Fundamental Science 2021*. San Jose, CA, May 9–14, 2021
- *61st Annual Meeting of the APS Division of Plasma Physics*. Fort Lauderdale, FL, Oct 21–25, 2019
- *Astro Coffee Seminar, Institute for Advanced Study*. Princeton, NJ, Oct 2, 2019
- *Space Physics Seminar, UC Berkeley*. Berkeley, CA, Sep 10, 2019
- *60th Annual Meeting of the APS Division of Plasma Physics*. Portland, OR, Nov 5–9, 2018
- *59th Annual Meeting of the APS Division of Plasma Physics*. Milwaukee, WI, Oct 23–27, 2017
- *58th Annual Meeting of the APS Division of Plasma Physics*. San Jose, CA, Oct 31–Nov 4, 2016
- *Princeton Graduate Seminar in Plasma Physics*. Princeton, NJ, Nov, 2015, 2016
- *Contest for Young Scientists in Memory of Academician A.P. Alexandrov*. Troitsk, Russia, Feb 27, 2013
- *RAS Scientific-Coordination Session "Non-Ideal Plasma Physics"*. Moscow, Russia, Dec 6–7, 2012
- *Moscow Institute of Physics and Technology 55th Scientific Conference*. Dolgoprudny, Russia, Nov 19, 2012
- *VII International Conference on Plasma Physics and Plasma Technology PPPT-7*. Minsk, Belarus, Sep 17–21, 2012

Awards and Prizes

- Bronze medal: Kaggle Dstl Satellite Imagery Feature Detection (Dec 2016 – Mar 2017)
- Gold medal: WorldQuant Challenge Autumn Alphathon 2015 (Oct 2015 – Dec 2015)
- Russian Presidential Scholarship for outstanding academic and research achievements (Mar 2012 – Jun 2013)
- Scholarship of Abramov-Frolov's fund (Feb 2008 – Jun 2011)

Skills and Professional Service

Computer skills: Python, LaTeX, MS Office, exposure to C/C++, Fortran, MATLAB, AWS, Mathematica, R

Language skills: Russian (native), English (fluent), Tatar (basic)

Service: Reviewer for Physical Review Research, Europhysics Letters