

Sergey A. Ponomarenko

Education

- Ph. D in Physics, University of Rochester, USA, April 2002
Thesis: “Spatial Coherence of Optical Wavefields and Solitons.”
Advisor: Professor Emil Wolf.
- Five-year diploma in physics, Novosibirsk State University, Russia, May 1994
Thesis: “Weak turbulence in systems with coupled wave modes”
Advisor: Professor Sergei K. Nemirovskii.

Professional Experience

- Associate Professor and Canada Research Chair, Dalhousie Univ., September 2010-Date
- Assistant Professor and Canada Research Chair, Dalhousie Univ., July 2006-July 2010
- Director’s Postdoctoral Fellow, Los Alamos National Laboratory Jan. 2004-July 2006.
- Postdoc. Associate, Dept. of Physics and Astronomy, U of Rochester, Jan. 2002-Dec. 2003.
- Research Assistant, Dept. of Physics and Astronomy, U of Rochester, Sep. 1998-Dec. 2001.
- Teaching Assistant, Dept. of Physics and Astronomy, U of Rochester, Sep. 1997-Sep. 1998.

Funding Sources (Past and Current)

- Natural Science and Engineering Research Council (NSERC).
- Canada Foundation for Innovation (CFI).
- US Department of Energy.

Awards and Honors

- Outstanding Reviewer Recognition, Optical Society of America (OSA) 2016.
- Canada Research Chair Renewal, NSERC, Canada, September 2010.
- Canada Research Chair Award, NSERC, Canada, February 2006.
- Director’s Postdoctoral Fellowship Award, Los Alamos National Lab., January 2004.
- Susumu Okubo Award for academic excellence, U of Rochester, May 1998.
- GAANN (Dept. of Education) Graduate Fellowship, U of Rochester, (1997-1999).
- First Degree Diploma of the International Scientific Student Conference, Novosibirsk, Russia, April 1995.
- Soros Foundation Grant for outstanding young scientists in Russia, September 1994.

Highly Qualified Personnel (HQP) Training

Postdoctoral Fellows:

- Weihong Huang (2006-2008)

Doctoral students:

- Montasir Qasymeh (co-advised) (2010);
- Soodeh Haghgoo (2012);
- Shunchuan Yang (co-advised) (2015);
- Laleh Mokhtarpour (2016)

Master's students:

- Mengdi Li (2009);
- Gazi Habiba Akter (2011);
- Luyu Wang (2013);
- Hao Cheng (2015);
- Liyuan Ma (2015);
- Nimisha Subash (2016)

Research Interests

- Nonlinear statistical optics
- Statistical plasmonics
- Optical coherence
- Fiber optics
- Underwater acoustics

Publications in Peer Reviewed Journals (HQP in bold font)

1. **Y. Chen**, S. A. Ponomarenko, and Y. Cai, "Self-steering partially coherent beams," *Sci. Rep.*, **7**, 39957 (2017).
2. **X. Liu**, F. Wang, L. Liu, **Y. Chen**, Y. Cai, and S. A. Ponomarenko, "Complex degree of coherence measurement for classical statistical fields," *Opt. Lett.*, **42**, 77 (2017).
3. **F. Che**, S. A. Ponomarenko, and M. Cada, "Giant spectral transformations in plasmon-enhanced difference-frequency generation with polychromatic light," *J. Opt.*, **18**, 125503 (2016).
4. F. Wang, **Y. Chen**, **X. Liu**, Y. Cai, and S. A. Ponomarenko, "Self-reconstruction of partially coherent beams scattered by opaque obstacles," *Opt. Express*, **24**, 23735 (2016).
5. **X. Liu**, J. Yu, **Y. Chen**, Y. Cai, and S. A. Ponomarenko, "Propagation of optical coherence lattices in the turbulent atmosphere," *Opt. Lett.*, **41**, 4182 (2016).

6. **Y. Chen**, S. A. Ponomarenko, and Y. Cai, "Experimental generation of optical coherence lattices," *Appl. Phys. Lett.*, **109**, 061107 (2016).
7. **Y. E. Monfared** and S. A. Ponomarenko, "Slow light generation via stimulated Brillouin scattering in liquid-filled photonic crystal fibers," *Optik*, **127**, 5800 (2016).
8. **L. Mokhtarpour** and S. A. Ponomarenko, "Fluctuating pulse propagation in resonant nonlinear media: self-induced transparency random phase soliton formation," *Opt. Express*, **23**, 30270 (2015).
9. **S. Yang**, S. A. Ponomarenko, and Z. Chen, "Coherent pseudo-mode decomposition of a new partially coherent source class," *Opt. Lett.*, **40**, 3081 (2015).
10. S. A. Ponomarenko, "Self-imaging of partially coherent light in graded-index media," *Opt. Lett.*, **40**, 566 (2015).
11. **L. Ma** and S. A. Ponomarenko, "Free-space propagation of optical coherence lattices and periodicity reciprocity," *Opt. Express*, **23**, 1848 (2015).
12. **L. Ma** and S. A. Ponomarenko, "Optical coherence gratings and lattices," *Opt. Lett.*, **39**, 6656 (2014).
13. **S. Yang**, Z. Chen, Y. Yu, and S. Ponomarenko, "On Numerical Dispersion of the Radial Point Interpolation Meshless Method," *IEEE Microw. Wireless Comp. Lett.*, **24**, 653 (2014).
14. **S. Yang**, Y. Yu, Z. Chen, and S. Ponomarenko, "A Time Domain Collocation Meshless Method with Local Radial Basis Functions for Transient Electromagnetic Analysis," *IEEE Trans. Antennas Propag.*, **62**, 5334 (2014).
15. **S. Yang**, Z. Chen, Y. Yu, and S. Ponomarenko, "A Divergence-Free Meshless Method Based on the Vector Basis Functions for Transient Electromagnetic Analysis," *IEEE Trans. Microw. Theory Techn.*, **62**, 1409 (2014).
16. **L. Wang**, S. A. Ponomarenko, and Z. Z. Chen, "Spectral coherence anomalies," *Opt. Lett.*, **15**, 2557 (2013).
17. **L. Wang**, **F. Che**, S. A. Ponomarenko, and Z. Z. Chen, "Plasmon-enhanced spectral changes in sum-frequency generation with polychromatic light," *Opt. Express*, **21**, 14159 (2013).
18. **S. Yang**, Z. D. Chen, Y. J. Yu, and S. Ponomarenko, "Efficient Implementation of the Divergence-Preserved ADI-FDTD Method," *IEEE Antennas and Wireless Propag. Lett.*, **11**, 1560 (2013).
19. **L. Mokhtarpour** and S. A. Ponomarenko, "Ultrashort pulse coherence properties in coherent linear amplifiers," *J. Opt. Soc. Am. A* **30**, 627 (2013).
20. **S. Haghgoo** and S. A. Ponomarenko, "Optical shocks in resonant media: The role of inhomogeneous broadening," *Opt. Commun.*, **286**, 344 (2013).
21. **L. Mokhtarpour**, **G. H. Akter**, and S. A. Ponomarenko, "Partially coherent self-similar pulses in resonant linear absorbers," *Opt. Express*, **20**, 17816 (2012).
22. **L. Mokhtarpour** and S. A. Ponomarenko, "Complex Area-Correlation Theorem for Statistical Pulses in Coherent Linear Absorbers," *Opt. Lett.*, **37**, 3498 (2012).
23. **S. Haghgoo** and S. A. Ponomarenko, "Self-induced transparency quadratic solitons," *Opt. Express*, **20**, 13988 (2012).

24. **S. Haghgoo** and S. A. Ponomarenko, "Shape-invariant pulses in resonant linear absorbers," *Opt. Lett.*, **37**, 1328 (2012).
25. S. A. Ponomarenko, "Degree of phase-space separability of statistical pulses," *Opt. Express*, **20**, 2548 (2012).
26. S. A. Ponomarenko, "Complex Gaussian Representation of Statistical Pulses," *Opt. Express*, **19**, 17086 (2011).
27. **S. Haghgoo** and S. A. Ponomarenko, "Self-similar pulses in coherent linear amplifiers," *Opt. Express*, **19**, 9750 (2011).
28. S. A. Ponomarenko and **S. Haghgoo**, "Self-similarity and optical kinks in resonant nonlinear media," *Phys. Rev. A, (Rapids)*, **82**, 051801(R) (2010).
29. S. A. Ponomarenko and **S. Haghgoo**, "Spatial similaritons in conservative nonintegrable systems," *Phys. Rev. A, (Rapids)*, **81**, 051801(R), (2010).
30. R. Borghi, F. Gori, and S. A. Ponomarenko, "On a class of electromagnetic diffraction free beams" *J. Opt. Soc. Am. A*, **26**, 2275 (2009).
31. **M. Qasymeh**, S. A. Ponomarenko, and M. Cada, "Ultrashort pulse polarization control in silicon waveguides," *Opt. Express*, **17**, 1795 (2009).
32. **M. Li**, S. A. Ponomarenko, **M. Qasymeh**, and M. Cada, "Electronic control of soliton power transfer in silicon nanocrystal waveguides," *Opt. Express*, **16** 9587 (2008).
33. **M. Qasymeh**, M. Cada, and S. A. Ponomarenko, "Applications of electro-optical Kerr effect to photonics devices" *IEEE, J. Quant. Electron.*, **44**, 740 (2008).
34. S. A. Ponomarenko and G. P. Agrawal, "Phase space quality factor for ultrashort pulsed beams", *Opt. Lett.*, **33**, 767 (2008).
35. S. A. Ponomarenko and G. P. Agrawal, "Nonlinear interaction of two or more similaritons in loss- and dispersion-managed fibers," *J. Opt. Soc. Am. B*, **25**, 983 (2008).
36. S. A. Ponomarenko, **W. Huang**, and M. Cada, "Dark and antidark diffraction-free beams," *Opt. Lett.*, **32**, 2508 (2007).
37. **W. Huang**, S. A. Ponomarenko, and M. Cada, "Polarization changes of partially coherent pulses propagating in optical fibers", *J. Opt. Soc. Am. A*, **24**, 3063 (2007).
38. S. A. Ponomarenko and G. P. Agrawal, "Optical similaritons in nonlinear waveguide amplifiers", *Opt. Lett.*, **32**, 1659 (2007).
39. S. A. Ponomarenko and G. P. Agrawal, "Interactions of chirped and chirp-free similaritons in fiber amplifiers", *Opt. Express*, **15**, 2963 (2007).
40. S. A. Ponomarenko, M. E. Sherrill, D. P. Kilcrease, and G. Csanak, "Statistical mean-field theory of finite quantum systems: canonical ensemble formulation", *J. Phys. A*, **39**, L499, (2006).
41. S. A. Ponomarenko and G. P. Agrawal, "Do Solitonlike Self-Similar Waves Exist in Nonlinear Optical Media?", *Phys. Rev. Lett.*, **97**, 013901 (2006).
42. S. A. Ponomarenko and G. P. Agrawal, "Linear optical bullets," *Opt. Commun.*, **261**, 1 (2006).

43. S. A. Ponomarenko, H. Roychowdhury, and E. Wolf, "Physical Significance of Complete Spatial Coherence of Optical Fields," *Phys. Lett. A*, **345**, 10 (2005).
44. H. Roychowdhury, S. A. Ponomarenko, and E. Wolf, "Changes in polarization of partially coherent electromagnetic beams propagating through the turbulent atmosphere", *J. Mod. Opt.*, **52**, 1611 (2005).
45. S. K. Nemirovskii and S. A. Ponomarenko, "Multi-scale perturbation analysis in hydrodynamics of the superfluid turbulence: Derivation of the Dresner equation," *Cryogenics*, **45**, 408 (2005).
46. J. Ellis, A. Dogariu, S. Ponomarenko, and E. Wolf, "Degree of polarization of statistically stationary electromagnetic fields," *Opt. Commun.*, **248**, 333 (2005).
47. S. A. Ponomarenko, N. M. Litchinitser, and G. P. Agrawal, "Theory of incoherent solitons: Beyond the mean-field approximation," *Phys. Rev. E, Rapid Communication*, **70**, 015603(R) (2004).
48. J. Ellis, A. Dogariu, S. Ponomarenko, and E. Wolf, "Correlation matrix of a completely polarized, statistically stationary electromagnetic field," *Opt. Lett.*, **29**, 1536 (2004).
49. S. A. Ponomarenko and G. P. Agrawal, "Asymmetric incoherent vector solitons," *Phys. Rev. E*, **69**, 036604 (2004).
50. S. A. Ponomarenko, G. P. Agrawal, and E. Wolf, "The energy spectrum of nonstationary ensembles of pulses" *Opt. Lett.*, **29**, 394 (2004).
51. S. A. Ponomarenko, "Quantum harmonic oscillator revisited: A Fourier transform approach," *Am. J. Phys.*, **72**, 1259 (2004).
52. S. A. Ponomarenko and E. Wolf, "The spectral degree of coherence of fully spatially coherent electromagnetic beams," *Opt. Commun.*, **227**, 73 (2003)
53. G. V. Bogatyryova, C. V. Fel'de, P. V. Polyanskii, S. A. Ponomarenko, M. S. Soskin, and E. Wolf, "Partially coherent vortex beams with a separable phase," *Opt. Lett.*, **28**, 878 (2003).
54. G. S. Agarwal and S. A. Ponomarenko, "Minimum-correlation mixed quantum states," *Phys. Rev. A*, **67**, 032103 (2003).
55. S. A. Ponomarenko and E. Wolf, "A solution to the inverse scattering problem for strongly fluctuating random media using partially coherent light," *Opt. Lett.*, **27**, 1770 (2002).
56. S. A. Ponomarenko and E. Wolf, "Spectral anomalies in a Fraunhofer diffraction pattern," *Opt. Lett.*, **27**, 1211 (2002).
57. S. A. Ponomarenko, J-J. Greffet, and E. Wolf, "The diffusion of partially coherent beams in turbulent media," *Opt. Commun.*, **128**, 1 (2002).
58. S. A. Ponomarenko, "Linear superposition principle for partially coherent solitons," *Phys. Rev. E, Rapid Communication*, **65**, 055601(R), (2002).
59. S. A. Ponomarenko and E. Wolf, "Universal structure of field correlations within a fluctuating medium," *Phys. Rev. E*, **65**, 016602 (2001).
60. S. A. Ponomarenko, "Twisted Gaussian Schell-model solitons," *Phys. Rev. E*, **64**, 036618, (2001).
61. S. A. Ponomarenko and E. Wolf, "Correlations in an open quantum system and associated uncertainty relations," *Phys. Rev. A*, **63**, 062106, (2001).

62. S. A. Ponomarenko and E. Wolf, "Effective spatial and angular correlations in beams of any state of coherence and an associated phase-space product," *Opt. Lett.*, **26**, 122 (2001).
63. S. A. Ponomarenko, "A class of partially coherent beams carrying optical vortices," *J. Opt. Soc. Am. A*, **18**, 150 (2001).
64. S. A. Ponomarenko and E. Wolf, "Light beams with minimum phase-space product," *Opt. Lett.*, **25**, 663 (2000).
65. S. A. Ponomarenko and A. V. Shchegrov, "Spectral changes of light produced by scattering from disordered anisotropic media," *Phys. Rev. E*, **60**, 3310 (1999).
66. S. A. Ponomarenko and E. Wolf, "Coherence properties of light in Young's interference pattern formed with partially coherent light," *Opt. Commun.*, **170**, 1 (1999).
67. S. K. Nemirovskii and S. A. Ponomarenko, "Elimination of the fast mode in hydrodynamics of superfluid turbulence," *Czech. J. Phys.*, **46**, 21, Suppl. 1 (1996).

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