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## Education

**Ph.D. in Physics** (specialities in Atomic physics and Quantum optics), 1998–2003

Dissertation: Nonlinear properties of dense coherent media  
Physics Department, Texas A&M University

**Diploma in Physics** (speciality in Quantum electronics), 1992–1998

Moscow State Engineering Physics Institute

## Employment History

**Professor of Physics, 2024–Present**

*Department of Physics, College of William & Mary*

**Associate Professor, 2018–2024**

*Department of Physics, College of William & Mary*

**Assistant Professor, 2013–2018**

*Department of Physics, College of William & Mary*

**Research Assistant Professor, 2010–2013**

*Department of Physics, College of William & Mary*

**Visiting Assistant Professor, 2006–2010**

*Department of Physics, College of William & Mary*

**Postdoctoral Associate, 2003–2006**

*Kavli Institute for Astrophysics and Space Research / LIGO Laboratory, Massachusetts Institute of Technology*

**Teaching/Research assistant, 1998–2003**

*Physics Department, Texas A&M University*

**Research assistant, 1997–1998**

*Frequency Standard Laboratory, Lebedev Physics Institute, Moscow, Russia*

## Awards

- **William Small Award for Faculty Excellence, 2017**
- **Named recipient of the Special Breakthrough Prize in Fundamental Physics, 2016**

## Publications

1. *In preparation*: Robert Behary, William Torg, Mykhailo Vorobiov, Nicolas DeStefano, Adam Vernon, Charlie T. Fancher, Neel Malvania, Eugeny E. Mikhailov, Seth Aubin, Irina Novikova, "Static dc electric field orientation effects on two-photon Rydberg EIT", arXiv:2601.09676, (2026).
2. *In preparation*: Robert Behary, Kevin Su, Nicolas DeStefano, Jennifer Tsai, Todd Averet, Alexandre Camsonne, Shukui Zhang, Charlie T. Fancher, Neel Malvania, Seth Aubin, Eugeny E. Mikhailov, Irina Novikova, "Electron Beam Profiling via Rydberg Electromagnetically Induced Transparency in Rubidium Vapor with Crossed Laser beams", arXiv:2601.02549, (2026).
3. Mario Gonzalez Maldonado, Yang Li, James A. McKelvy, Andrey Matsko, Irina Novikova, Eugeny E. Mikhailov, John Kitching, Ying-Ju Wang, "Light shift suppression in a CPT magnetometer using linear polarization and double frequency interrogation", *Optics Letters*, Issue 2, **51**, 257-260, (2026).
4. *In preparation*: Owen Rollins, Eugeny E. Mikhailov, Irina Novikova, "Magnetic field direction detection using Electromagnetically Induced Transparency with vector vortex beam", *Optica Open*, (2025).
5. *In preparation*: Mykhailo Vorobiov, Robert Behary, Will Torg, Nicolas DeStefano, Saskia Mordijck, Edward Thomas Jr., Saikat Chakraborty Thakur, Charlie T. Fancher, Neel Malvania, Seth Aubin, Eugeny E. Mikhailov, Irina Novikova, "Non-perturbative 2D spatial measurements of electric fields within a plasma sheath", arXiv:2511.12322, (2025).
6. Robert Behary, Kevin Su, Nicolas DeStefano, Mykhailo Vorobiov, Todd Averet, Alexandre Camsonne, Shukui Zhang, Charlie Fancher, Neel Malvania, Eugeny E. Mikhailov, Seth Aubin, Irina Novikova, "Electron beam characterization via fluorescence imaging of Rydberg states in atomic vapor", *Phys. Rev. Research*, **7**, L042042, (2025).
7. Kevin Su, Robert Behary, Seth Aubin, Eugeny E. Mikhailov, Irina Novikova, "Two-photon Rydberg EIT resonances in non-collinear beam configurations", *JOSA B*, Issue 4, **42**, 757-762, (2025).

8. Noah Schlossberger, Tate McDonald, Kevin Su, Rajavardhan Talashila, Robert Behary, Charles L. Patrick, Daniel Hammerland, Eugeny E. Mikhailov, Seth Aubin, Irina Novikova, Christopher L. Holloway, Nikunj Kumar Prajapati, "Two-dimensional imaging of electromagnetic fields via light sheet fluorescence imaging with Rydberg atoms", *Optics Letters*, Issue 23, **50**, 7312-7315, (2025).
9. Nicolas DeStefano, Saeed Pegahan, Aneesh Ramaswamy, Seth Aubin, Todd Averet, Alexandre Camsonne, Svetlana Malinovskaya, Eugeny E. Mikhailov, Gunn Park, Shukui Zhang, Irina Novikova, "Electron beam characterization via quantum coherent optical magnetometry", *Applied Physics Letter*, Issue 26, **125**, 264001, (2024).
10. Mario Gonzalez Maldonado, Owen Rollins, Alex Toyryla, James A. McKelvy, Andrey Matsko, Isaac Fan, Yang Li, Ying-Ju Wang, John Kitching, Irina Novikova, Eugeny E. Mikhailov, "Sensitivity of a vector atomic magnetometer based on electromagnetically induced transparency", *Optics Express*, **32**, 25062-25073, (2024).
11. Rob Behary, Alex Gill, Aaron Buikema, Eugeny E. Mikhailov, Irina Novikova, "Rydberg Raman-Ramsey resonances in atomic vapor", *Phys. Rev. A*, **109**, 053706, (2024).
12. James McKelvy, Mario Gonzalez, Irina Novikova, Eugeny E. Mikhailov, Andrey Matsko, "Technical limits of sensitivity for EIT magnetometry", *Applied Optics*, Issue 24, **62**, 6518-6527, (2023).
13. James McKelvy, Irina Novikova, Eugeny E. Mikhailov, Mario Gonzalez, Isaac Fan, Yang Li, Ying-Ju Wang, John Kitching, Andrey Matsko, "Application of Kernel Principal Component Analysis for Optical Vector Atomic Magnetometry", *Machine Learning: Science and Technology*, ad0fa4, (2023).
14. Charris Gabaldon, Pratik J. Barge, Savannah L. Cuozzo, Irina Novikova, Hwang Lee, Lior Cohen, Eugeny E. Mikhailov, "Quantum fluctuations spatial mode profiler", *AVS Quantum Science*, **5**, 025005, (2023).
15. Savannah L. Cuozzo, Charris Gabaldon, Pratik J. Barge, Ziqi Niu, Hwang Lee, Lior Cohen, Irina Novikova, Eugeny E. Mikhailov, "Wave-Front Reconstruction via Single-Pixel Homodyne Imaging", *Optics Express*, Issue 21, **30**, 37938--37945, (2022).
16. Pratik J. Barge, Ziqi Niu, Savannah L. Cuozzo, Eugeny E. Mikhailov, Irina Novikova, Hwang Lee, Lior Cohen, "Weak Thermal State Quadrature-Noise Shadow Imaging", *Optics Express*, Issue 16, **30**, 29401--29408, (2022).
17. David D. Smith, Hongrok Chang, Eugeny E. Mikhailov, Selim M. Shahriar, "Beyond the Petermann limit: can exceptional points increase sensor precision?", *Phys. Rev. A*, **106**, 013520, (2022).
18. Savannah L. Cuozzo, Pratik J. Barge, Nikunj Kumar Prajapati, Narayan Bhusal, Hwang Lee, Lior Cohen, Irina Novikova, Eugeny E. Mikhailov, "Low-Light Shadow Imaging Using Quadrature-Noise Detection with a Camera", *Advanced Quantum Technologies*, 2100147, (2022).
19. Elisha S. Matekole, Savannah L. Cuozzo, Nikunj Kumar Prajapati, Narayan Bhusal, Hwang Lee, Irina Novikova, Eugeny E. Mikhailov, Jonathan P. Dowling, Lior Cohen, "Quantum-Limited Squeezed Light Detection with a Camera", *Phys. Rev. Lett.*, **125**, 113602, (2020).
20. Han Bao, Junlei Duan, Shenchao Jin, Xingda Lu, Pengxiong Li, Weizhi Qu, Mingfeng Wang, Irina Novikova, Eugeny E. Mikhailov, Kai-Feng Zhao, Klaus Mølmer, Heng Shen, Yanhong Xiao, "Spin squeezing of  $10^{11}$  atoms by prediction and retrodiction measurements", *Nature*, **581**, 159-163, (2020).
21. Jian Sun, Xichang Zhang, Weizhi Qu, Eugeny E. Mikhailov, Irina Novikova, Heng Shen, Yanhong Xiao, "Spatial Multiplexing of Squeezed Light by Coherence Diffusion", *Phys. Rev. Lett.*, **123**, 203604, (2019).
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23. Ravn M. Jenkins, Eugeny E. Mikhailov, Irina Novikova, "Transit Ramsey EIT resonances in a Rb vacuum cell", *JOSA B*, Issue 4, **36**, 890-895, (2019).
24. Savannah L. Cuozzo, Eugeny E. Mikhailov, "Dispersion-enhanced tunability of the laser-frequency response to the cavity-length change", *Phys. Rev. A*, **100**, 023846, (2019).
25. LIGO Scientific Collaboration, VIRGO Collaboration, "Search for gravitational waves from Scorpius X-1 in the second Advanced LIGO observing run with an improved hidden Markov model", *Phys. Rev. D*, **100**, 122002, (2019).
26. LIGO Scientific Collaboration, VIRGO Collaboration, "Tests of general relativity with the binary black hole signals from the LIGO-Virgo catalog GWTC-1", *Phys. Rev. D*, **100**, 104036, (2019).
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29. LIGO Scientific Collaboration, VIRGO Collaboration, "All-sky search for continuous gravitational waves from isolated neutron stars using Advanced LIGO O2 data", *Phys. Rev. D*, **100**, 024004, (2019).
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34. LIGO Scientific Collaboration, "Search for Gravitational Waves from a Long-lived Remnant of the Binary Neutron Star Merger GW170817", *The Astrophys. J.*, Number 2, **875**, 160, (2019).
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39. LIGO Scientific Collaboration, "A Fermi Gamma-Ray Burst Monitor Search for Electromagnetic Signals Coincident with Gravitational-wave Candidates in Advanced LIGO's First Observing Run", *The Astrophys. J.*, Number 1, **871**, 90, (2019).
40. LIGO Scientific Collaboration, VIRGO Collaboration, ANTARES Collaboration, IceCube Collaboration, "Search for Multimessenger Sources of Gravitational Waves and High-energy Neutrinos with Advanced LIGO during Its First Observing Run, ANTARES, and IceCube", *The Astrophys. J.*, Number 2, **870**, 134, (2019).
41. LIGO Scientific Collaboration, VIRGO Collaboration, "Binary Black Hole Population Properties Inferred from the First and Second Observing Runs of Advanced LIGO and Advanced Virgo", *The Astrophys. J. Lett.*, Number 2, **882**, L24, (2019).
42. LIGO Scientific Collaboration, VIRGO Collaboration, "Properties of the Binary Neutron Star Merger GW170817", *Phys. Rev. X*, **9**, 011001, (2019).
43. R. Nicholas Lanning, Zhihao Xiao, Mi Zhang, Irina Novikova, Eugeny E. Mikhailov, Jonathan P. Dowling, "Quantized nonlinear Gaussian-beam dynamics: Tailoring multimode squeezed-light generation", *Phys. Rev. A*, **98**, 043824, (2018).
44. Eugeny E. Mikhailov, "Programming with matlab for scientists: A Beginner's Introduction", CRC Press, Taylor & Francis, (2018).
45. Melissa A. Guidry, Elena Kuchina, Irina Novikova, Eugeny E. Mikhailov, "Characterization of frequency stability in electromagnetically induced transparency-based atomic clocks using a differential detection scheme", *JOSA B, Issue 10*, **34**, 2244-2249, (2017).
46. Zhihao Xiao, R. Nicholas Lanning, Mi Zhang, Irina Novikova, Eugeny E. Mikhailov, Jonathan P. Dowling, "Why a hole is like a beam splitter: A general diffraction theory for multimode quantum states of light", *Phys. Rev. A*, **96**, 023829, (2017).
47. R. Nicholas Lanning, Zhihao Xiao, Mi Zhang, Irina Novikova, Eugeny E. Mikhailov, Jonathan P. Dowling, "Gaussian-beam-propagation theory for nonlinear optics involving an analytical treatment of orbital-angular-momentum transfer", *Physical Review A*, **96**, 013830, (2017).
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49. Demetrious T. Kutzke, Owen Wolfe, Simon M. Rochester, Dmitry Budker, Irina Novikova, Eugeny E. Mikhailov, "Tailorable dispersion in a four-wave mixing laser", *Optics Letters, Issue 14*, **42**, 2846, (2017).
50. ANTARES Collaboration, IceCube Collaboration, LIGO Scientific Collaboration, VIRGO Collaboration, "Search for high-energy neutrinos from gravitational wave event GW151226 and candidate LVT151012 with ANTARES and IceCube", *Phys. Rev. Lett.*, **96**, 022005, (2017).
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53. LIGO Scientific Collaboration, Virgo Collaboration, "Directional limits on persistent gravitational waves from Advanced LIGO's first observing run", *Physical review letters*, **118**, American Physical Society, 121102, (2017).
54. LIGO Scientific Collaboration, Virgo Collaboration, "Upper limits on the stochastic gravitational-wave background from Advanced LIGO's first observing run", *Physical review letters*, **118**, American Physical Society, 121101, (2017).
55. LIGO Scientific Collaboration, "Calibration of the Advanced LIGO detectors for the discovery of the binary black-hole merger GW150914", *Physical Review D*, **95**, American Physical Society, 062003, (2017).
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57. LIGO Scientific Collaboration, Virgo Collaboration, "Search for gravitational waves from Scorpius X-1 in the first Advanced LIGO observing run with a hidden Markov model", *Physical Review D*, **95**, American Physical Society, 122003, (2017).

58. LIGO Scientific Collaboration, Virgo Collaboration, "Search for intermediate mass black hole binaries in the first observing run of Advanced LIGO", *Physical Review D*, **96**, American Physical Society, 022001, (2017).
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61. LIGO Scientific Collaboration, Virgo Collaboration, "First narrow-band search for continuous gravitational waves from known pulsars in advanced detector data", *Physical Review D*, **96**, American Physical Society, 122006, (2017).
62. LIGO Scientific Collaboration, Virgo Collaboration, "GW170814: A Three-Detector Observation of Gravitational Waves from a Binary Black Hole Coalescence", *Physical Review Letters*, **119**, American Physical Society, 141101, (2017).
63. LIGO Scientific Collaboration, Virgo Collaboration, "GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral", *Physical Review Letters*, **119**, American Physical Society, 161101, (2017).
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66. LIGO Scientific Collaboration, Virgo Collaboration, "Effects of waveform model systematics on the interpretation of GW150914", *Classical and Quantum Gravity*, **34**, 104002, (2017).
67. LIGO Scientific Collaboration, "Exploring the Sensitivity of Next Generation Gravitational Wave Detectors", *Classical and Quantum Gravity*, **34**, 044001, (2017).
68. LIGO Scientific Collaboration, Virgo Collaboration, "Search for Gravitational Waves Associated with Gamma-Ray Bursts during the First Advanced LIGO Observing Run and Implications for the Origin of GRB 150906B", *The Astrophysical Journal*, **841**, IOP Publishing, (2017).
69. LIGO Scientific Collaboration, Virgo Collaboration, "Upper Limits on Gravitational Waves from Scorpius X-1 from a Model-based Cross-correlation Search in Advanced LIGO Data", *The Astrophysical Journal*, **847**, IOP Publishing, (2017).
70. LIGO Scientific Collaboration, Virgo Collaboration, "Gravitational Waves and Gamma-Rays from a Binary Neutron Star Merger: GW170817 and GRB 170817A", *The Astrophysical Journal Letters*, **848**, IOP Publishing, L13, (2017).
71. LIGO Scientific Collaboration, Virgo Collaboration, "Multi-messenger Observations of a Binary Neutron Star Merger", *The Astrophysical Journal Letters*, **848**, IOP Publishing, L12, (2017).
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73. LIGO Scientific Collaboration, Virgo Collaboration, "On the Progenitor of Binary Neutron Star Merger GW170817", *The Astrophysical Journal Letters*, **850**, IOP Publishing, L40, (2017).
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75. LIGO Scientific Collaboration, Virgo Collaboration, "Search for Post-merger Gravitational Waves from the Remnant of the Binary Neutron Star Merger GW170817", *The Astrophysical Journal Letters*, **851**, IOP Publishing, L16, (2017).
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77. LIGO Scientific Collaboration, Virgo Collaboration, "Directly comparing GW150914 with numerical solutions of Einstein's equations for binary black hole coalescence", *Physical Review D*, **94**, American Physical Society, 064035, (2016).
78. LIGO Scientific Collaboration, Virgo Collaboration, "The rate of binary black hole mergers inferred from Advanced LIGO observations surrounding GW150914", *The Astrophysical Journal Letters*, **833**, IOP Publishing, L1, (2016).
79. LIGO Scientific Collaboration, Virgo Collaboration, "Supplement: The Rate of Binary Black Hole Mergers Inferred from Advanced LIGO Observations Surrounding GW150914", *The Astrophysical Journal Supplement Series*, **227**, IOP Publishing, 14, (2016).
80. LIGO Scientific Collaboration, Virgo Collaboration, "Properties of the binary black hole merger GW150914", *Physical Review Letters*, **116**, American Physical Society, 241102, (2016).
81. LIGO Scientific Collaboration, Virgo Collaboration, "Improved analysis of GW150914 using a fully spin-precessing waveform model", *Physical Review X*, **6**, American Physical Society, 041014, (2016).
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83. LIGO Scientific Collaboration, Virgo Collaboration, "Search for transient gravitational waves in coincidence with short-duration radio transients during 2007--2013", *Physical Review D*, **93**, American Physical Society, 122008, (2016).

84. LIGO Scientific Collaboration, Virgo Collaboration, "Comprehensive all-sky search for periodic gravitational waves in the sixth science run LIGO data", *Physical Review D*, **94**, American Physical Society, 042002, (2016).
85. LIGO Scientific Collaboration, Virgo Collaboration, "Upper limits on the rates of binary neutron star and neutron star--black hole mergers from advanced LIGO's first observing run", *The Astrophysical Journal Letters*, **832**, IOP Publishing, L21, (2016).
86. LIGO Scientific Collaboration, Virgo Collaboration, "Results of the deepest all-sky survey for continuous gravitational waves on LIGO S6 data running on the Einstein@Home volunteer distributed computing project", *Physical Review D*, **94**, American Physical Society, 102002, (2016).
87. LIGO Scientific Collaboration, Virgo Collaboration, "The basic physics of the binary black hole merger GW150914", *Annalen der Physik*, **529**, 1600209, (2016).
88. LIGO Scientific Collaboration, Virgo Collaboration, "Binary black hole mergers in the first Advanced LIGO observing run", *Physical Review X*, **6**, American Physical Society, 041015, (2016).
89. LIGO Scientific Collaboration, "Localization and broadband follow-up of the gravitational-wave transient GW150914", *The Astrophysical journal letters*, **826**, IOP Publishing, L13, (2016).
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91. LIGO Scientific Collaboration, Virgo Collaboration, "Characterization of transient noise in Advanced LIGO relevant to gravitational wave signal GW150914", *Classical and Quantum Gravity*, **33**, IOP Publishing, 134001, (2016).
92. LIGO Scientific Collaboration, Virgo Collaboration, "Search of the Orion spur for continuous gravitational waves using a loosely coherent algorithm on data from LIGO interferometers", *Physical Review D*, **93**, American Physical Society, 042006, (2016).
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100. LIGO Scientific Collaboration, "Astrophysical implications of the binary black hole merger GW150914", *The Astrophysical Journal Letters*, **818**, IOP Publishing, L22, (2016).
101. LIGO Scientific Collaboration, "GW151226: Observation of Gravitational Waves from a 22-Solar-Mass Binary Black Hole Coalescence", *Phys. Rev. Lett.*, **116**, 241103, (2016).
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115. LIGO Scientific Collaboration, "Multimessenger search for sources of gravitational waves and high-energy neutrinos: Initial results for LIGO-Virgo and IceCube", *Phys. Rev. D*, **90**, 102002, (2014).
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