CURRICULUM VITAE

Marianna S. Safronova

Professor

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Research Areas

- Search for new physics beyond the Standard Model of elementary particles
  - Dark matter searches
  - Search for the variation of fundamental constants
  - Search for violation of local Lorentz invariance
  - Studies of fundamental symmetries. Weak interactions in heavy atoms
  - Search for permanent electric electric-dipole moment
- Fundamental physics with quantum technologies in space
- Development of atomic and nuclear clocks and their applications
- Development of quantum many-body theory for calculating atomic properties
- Ultracold atoms, cooling and trapping schemes
- Quantum simulation and quantum computing
- Development of online portal for high-precision data and computations
- Study of long-range interactions
- Study of superheavy atoms
- Study of highly-charged ions and their applications
- Laser cooling of negative ions and prediction of their properties

Education

- B.S. and M.S. equivalent, Moscow State University, Department of Physics, Quantum statistics and Field theory group, Moscow, Russia (1988-1994). Thesis title: Renormalization of Topological Yang-Mills Theory. Award: Diploma with excellent grades.
- Ph.D, Department of Physics, University of Notre Dame (1994-2001). Thesis title: High-precision Calculations of Atomic Properties and Parity Nonconservation in Systems with One Valence Electron. Ph. D. Advisor: Walter R. Johnson.

Professional Positions

- Professor, Department of Physics and Astronomy, University of Delaware (2013 - present)
- Adjunct Fellow, Joint Quantum Institute, NIST and University of Maryland, College Park, MD (2012 - present)
- Associate Professor, Department of Physics and Astronomy, University of Delaware (2008 - 2013)
- Assistant Professor, Department of Physics and Astronomy, University of Delaware (2003 - 2008)
- Guest researcher at National Institute of Standards and Technology (September 2001 - 2004, 2012 - present), full time at NIST (September 2001 - July 2003)
- Postdoctoral Research Associate, University of Notre Dame, Department of Physics (January 2001-July 2003). Notre Dame postdoctoral advisor: Walter R. Johnson; NIST postdoctoral advisor: Charles W. Clark.
- Graduate Research Assistant, University of Notre Dame, Department of Physics (1995-2001)
- Graduate Teaching Assistant, University of Notre Dame, Department of Physics (1994-1995)

Visiting Positions and Travel Grants

- Visiting Professor, CNRS-Universite de Provence, Marseille, France, June 2008.
- Visiting Scientist, Joint Quantum Institute, NIST and University of Maryland, June 2010 and June/July 2012.
- Godfrey Fellow, School of Physics, University of New South Wales, Australia, December 2012.
- Godfrey Fellow, School of Physics, University of New South Wales, Australia, November - December 2014.
- Godfrey Fellow, School of Physics, University of New South Wales, Australia, November - December 2016, March 2017.

Research and Teaching Summary

Research

Marianna Safronova's diverse research interests include applications of quantum technologies to search for physics beyond the standard model of elementary particles and fields, development of atomic and nuclear clocks and their applications, dark matter searches, ultra-cold atoms and quantum information, studies of fundamental symmetries, quantum many-body theory and development of high-precision relativistic atomic codes, development of the online atomic data portal, highly-charged ions, superheavy atoms, and other topics.

Her research involves both the study of the fundamental physics problems and development of future technologies. She is the author of over 200 peer-reviewed papers. She has given over 200 invited talks at conferences, workshops, colloquiums, and seminars in US and abroad.

Teaching

Marianna Safronova has taught the courses at both undergraduate and graduate levels at the University of Delaware: Great Discoveries and Unanswered Questions in Physics (undergraduate), Fundamentals of Physics I (undergraduate), Quantum Mechanics I (undergraduate), Quantum Mechanics II (undergraduate), Quantum Computation (undegraduate/graduate), Atomic Physics (undegraduate/graduate), Quantum Mechanics II (graduate), and Electromagnetic Theory II (graduate). She has developed Great Discoveries and Unanswered Questions in Physics (undergraduate), Quantum Computation (graduate/undegradute) and Quantum Mechanics II (undergraduate) courses that have not been previously taught at the University of Delaware. She has developed a set of “interactive’ lectures for Quantum Mechanics I and II (undergraduate), Quantum Computation, and Atomic Physics courses to increase student participation and student comprehension of the material. These lectures include sets of in-class exercises as well allow students to participate in derivation of formulas carried out in class. All lecture notes are available at her web site http://www.mariannasafronova.com (PHYS311, PHYS424, PHYS425, PHYS650, PHYS626, PHYS812).

Professional Activities

- **Member of the Physical Sciences Panel for Decadal Survey on Biological and Physical Sciences Research in Space 2023-2032 (2022 - present)**
- Member of Advisory Editorial Board of Progress in Particle and Nuclear Physics (2023 – present)
- Coordinator of 2023 New Directions in Quantum Metrology KITP program.
- Coordinator of 2023 KITP Conference *Frontiers of Quantum Metrology: Fundamental Physics, Unexpected Connections, and Novel Applications*.
- Convener for European Strategy for Particle Physics (ECFA) Quantum Sensor Detector R&D Roadmap implementation (2023 - present).
- Chair of Data Science Institute's DARWIN Computing Symposium (2022 – 2023)
- Member of the Governance Committee, Quantum Science and Engineering (QSE) graduate degree program, University of Delaware (2021 – present)
- Curriculum workshop series organizer, Quantum Science and Engineering (QSE) graduate degree program, University of Delaware (2021 – 2022)
- Chair of DAMOP Nominating Committee (2019 - 2020)
- Member of the Scientific Advisory Committee of ExtreMe Matter Institute (EMMI), GSI, Germany (2020 – present)
- **Editor of the Quantum Science and Technology IOP Journal Special Issue: "Quantum sensors for new-physics discoveries." (2020 - 2022)**
- Member of the Quantum Science and Technology Editorial Board (2019 - present)
- Member for CLEO 2021 S&I 15 subcommittee (2020 – present)
- 2021 Munich Institute for Astro- and Particle Physics (MIAPP) Program Coordinator, *Particle & AMO physicists discussing quantum sensors and new physics*
- **Member of the committee on a Decadal Assessment and Outlook Report on Atomic, Molecular, and Optical Science (AMO2020), National Academy of Sciences, Engineering and Medicine (2018-2019)**
- Division of the Atomic, Molecular, and Optical Physics (DAMOP) Past Chair (2019 – 2020)
- Member of the Institute for Theoretical Atomic and Molecular Physics Institute (ITAMP), Cambridge, USA (2018-present)
- Scientific Advisory Board, JILA, University of Colorado and NIST, Boulder, USA (2018-present)
- Workshop organizer, Chair, *Precision-measurement Searches for New Physics*, Fifth annual workshop of APS Group on Precision Measurement and Fundamental Symmetries (GPMFC) (2020)
- Member of International Advisory Board for 2020 Highly charged ion (HCI) conference (2020)
- **Division of the Atomic, Molecular, and Optical Physics (DAMOP) Chair (2018 - 2019)**
- Workshop organizer, Chair, *New Ideas in dark matter searches*, Fourth annual workshop of APS Group on Precision Measurement and Fundamental Symmetries (GPMFC) (2019)
- DAMOP Chair Elect (2017 - 2018)
- Workshop organizer, Chair, *Precision-measurement Searches for New Physics*, Third annual workshop of APS Group on Precision Measurement and Fundamental Symmetries (GPMFC) (2018)

- Chair of DAMOP Fellowship Committee (2016 - 2017)
- DAMOP Vice Chair (2016 - 2017)
- Chair of Gordon Atomic Physics Conference (2015 - 2017)
- Workshop organizer, Chair, *Ultralight Dark Matter*, Second annual workshop of APS
- Group on Precision Measurement and Fundamental Symmetries (GPMFC) (2017)
- Member of DAMOP Education Committee (2015)
- Workshop organizer, Chair, *Tests of Fundamental Symmetries*, First workshop of APS Group on Precision Measurement and Fundamental Symmetries (2015)
- Member of DCOMP nomination Committee (2015 - 2016)
- Member of Mid-Atlantic APS Executive Committee (2015 - 2016)
- Vice-Chair of Gordon Atomic Physics Conference (2013 - 2015)
- Member of the Editorial board of the Physical Review A (2012 - 2018)
- Secretary/Treasurer of the American Physical Society (APS) Precision Measurement and Fundamental Symmetries Group (2013 - 2016)
- Member of the National Research Council Committee on Atomic, Molecular, and Optical Sciences (CAMOS) (2014 - 2015)
- Member of the Executive Committee for the Division of the Atomic, Molecular, and Optical Physics (DAMOP) (2012 - 2015)
- Member the DAMOP Program committee (2014 - 2015)
- Member the DAMOP Thesis Prize committee (2012 - 2013)
- Member of the APS Committee on the Status of Women in Physics (2011 - 2014)
- Chair of the Maria Goeppert Mayer Award APS committee (2014)
- Member of the Maria Goeppert Mayer Award APS committee (2013)
- The National Science Foundation (NSF) panels (several times)
- NSF Committee of Visitors that reviews the work of US National Science Foundation
- NSF Panel: ``What are the Grand Challenges for Symbolic, Numeric and Algebraic Scientific Computing?"
- Reviewer for the National Science Foundation, Department of Energy, Natural Sciences and Engineering Research Council of Canada, European Research Council, German Research Foundation, Science, Nature, Nature Physics, Nature Communications, Physical Review Letters, Physical Review A, Physical Review E, Physical Review X, New Journal of Physics, Journal of Physics B,Astrophysical Journal, Atomic Data and Nuclear Data Tables, The European Physical Journal D, Europhysics Letters, Physics Letters A, Chemical Physics, Optics Communications, Journal of Mathematical Physics, Physica Scripta, Central European Journal of Physics, International Journal of Mass Spectrometry, Journal of Quantitative Spectroscopy and Radiative Transfer, and Addison Wesley.

Honors and Awards

- Gordon Godfrey Fellowship, UNSW, Australia, 2016 - 2017
- Gordon Godfrey Fellowship, UNSW, Australia, 2014
- University of Delaware College of Arts and Sciences Outstanding Scholar Award, 2013
- Gordon Godfrey Fellowship, UNSW, Australia, 2012
- Women Physicist of the Month Award (2012) http://www.aps.org/programs/women/scholarships/womanmonth/2012.cfm
- Marianna Safronova have been elected a fellow of the American Physical Society (APS) in 2011 for ***innovative development of high-accuracy first-principles methods of computational atomic structure and dynamics, and their application to optical atomic clocks, quantum computing with neutral atoms, and tests of fundamental symmetries.*** She was nominated by the Division of Atomic, Molecular and Optical Physics.
- 2000 SGI Award for Excellence in Computational Sciences and Visualization at the University of Notre Dame for work ***Parity Nonconservation in Atomic Francium***. This award recognizes outstanding contributions by a graduate student in the areas of computational sciences and visualization.

Research Grants

- Elements: Scalable and Automated Atomic Portal - Bridging the Gap Between Research Codes and User Community, National Science Foundation, in collaboration with Rudolf Eigenmann, Electrical & Computer Engineering, 2022 – 2025 ($600,000 total, Safronova's group funding: $300,000]
- New directions in the development of atomic clocks, Office of Naval Research, 2020 – 2023 ($729,123)
- QLCI – CI: NSF Quantum Leap Challenge Institute for Enhanced Sensing and Distribution Using Correlated Quantum States, National Science Foundation, 2020 – 2025, (Safronova's group funding: $474,976)
- NSF-BSF: High-Precision Atomic Methodologies and New Physics Searches, National Science Foundation, (Safronova's group funding: $400,464)
- Thorium nuclear clock for tests of fundamental physics, European Research Counsel, 2020 – 2026, in collaboration with TU Wien (Austria), PTB, and LMU (Germany) ($15,117,621 total, Safronova's group funding: $1,703,356)
- Community portal for high-precision atomic physics data and computation, National Science Foundation, in collaboration with Rudolf Eigenmann, Electrical & Computer Engineering, 2019 – 2022 ($559,999 total, Safronova's group funding: $280,000]
- Modeling of optically trapped atoms for quantum information and atomic clocks, National Institute of Standards and Technology, 2017 – 2020 ($195,000)
- New Directions in the Development of Atomic Clocks, Office of Naval Research, 2017 – 2020 ($624,677)
- Theoretical study of highly charged $3d^n$ ions, National Institute of Standards and Technology, 2017 ($30,000)

- Development of next-generation relativistic program for all-order treatment of many-electron systems, National Science Foundation, 2016 - 2020 ($420,000).
- A multi-year collaborative research on highly-charged ions for precision measurements, National Institute of Standards and Technology, 2015 – 2020 ($251,500).
- Modeling of optically trapped atoms for quantum information and atomic clocks, National Institute of Standards and Technology, 2014 – 2017 ($227,760).
- Development of Atomic Theory for Tests of Fundamental Symmetries, National Science Foundation 2014 - 2017 ($180,000).
- Development of a relativistic atomic code for accurate treatment of complex correlations, National Science Foundation Computational Physics, 2015 - 2016 ($90,000).
- Development of a relativistic atomic code for accurate treatment of complex correlations, National Science Foundation (Physics at the Information Frontier program), 2012-2015 ($315,000).
- New Directions in Atomic PNC, National Science Foundation, 2011-2014 ($225,000).
- Modeling of optically trapped atoms for quantum information and atomic clocks, National Institute of Standards and Technology, 2011-2014 ($180,000).
- New Directions in Atomic PNC, National Science Foundation, 2008-2011 ($255,000).
- Modeling of optically trapped atoms for quantum information and atomic clocks, National Institute of Standards and Technology, 2008-2011 ($165,000).
- Collaborative research: New Directions in Atomic PNC, National Science Foundation, 2005-2008 (UD part: 180,000).
- Modeling of quantum logic operations with trapped neutral atoms, National Institute of Standards and Technology, 2004-2007 ($147,000).
- Optical atomic clock with trapped ytterbium atoms, University of Delaware Research Foundation, 2005 ($25,000).

Research Group

Research Scientist (RA III): Dr. Sergey Porsev, Dr. Dmytro Filiin
Postdocs: Dr. Charles Cheung, Dr. Jason Arakawa
Current Graduate Students: Muhammad Hani Zaheer

Graduated:

- Bindiya Arora (Ph.D, 2008)
- Rupsi Pal (Ph.D, 2008)
- Eugeniya Tchoukova (Ph.D, 2008)
- Dansha Jiang (Ph.D, 2010)
- Matt Simmons (M.S., 2012)
- Dadong Huang (M.S., 2016)
- Z. Zuhrianda (Ph.D, 2017)
- Charles Cheung (Ph. D., 2020)
- Aung Naing (Ph. D., 2021)
- Adam Marrs (M.S., 2021)

Visiting Scholars

- Dr. Mikhail Kozlov, Petersburg Nuclear Physics Institute, Gatchina, Russia (Visited University of Delaware several times for 1-2 months, 2008-2019)
- Prof. Ilya Tupitsyn, University of St. Petersburg, Petergof, Russia (Visited University of Delaware three times for 1 month, 2013-2019)
- Dr. Vladimir Dzuba, School of Physics, University of New South Wales, Australia, (Visited University of Delaware from September 2004 to December 2004)

Professional Organizations

American Physical Society, The Division of Atomic, Molecular and Optical Physics of the American Physical Society, The Topical Group on Precision Measurement and Fundamental Constants, Mid-Atlantic section of APS.

List of Publications in Peer-Reviewed Journals

1. Oscillating nuclear charge radii as sensors for ultralight dark matter, Abhishek Banerjee, Dmitry Budker, Melina Filzinger, Nils Huntemann, Gil Paz, Gilad Perez, Sergey Porsev, Marianna Safronova, arXiv:2301.10784 (2023).

2. Optical Telecommunications-Band Clock based on Neutral Titanium Atoms, Scott Eustice, Dmytro Filin, Jackson Schrott, Sergey Porsev, Charles Cheung, Diego Novoa, Dan M. Stamper-Kurn, Marianna S. Safronova, arXiv:2301.13363 (2023).

3. A Portal for High-Precision Atomic Data and Computation: Design and Best Practices, Parinaz Barakhshan, Akshay Bhosale, Amani Kiruga, Rudolf Eigenmann, Marianna S. Safronova, Bindiya Arora, arXiv:2212.10665 (2023).

4. Direct detection of ultralight dark matter bound to the Sun with space quantum sensors, Yu-Dai Tsai, Joshua Eby and Marianna S. Safronova, Nature Astronomy 7, 113 (2023).

5. The Phenomenology of Quadratically Coupled Ultra Light Dark Matter, Abhishek Banerjee, Gilad Perez, Marianna Safronova, Inbar Savoray, Aviv Shalit, arXiv:2211.05174 (2022).

6. State-Insensitive Trapping of Alkaline-Earth Atoms in a Nanofiber-Based Optical Dipole Trap, K. Ton, G. Kestler, D. Filin, C. Cheung, P. Schneeweiss, T. Hoinkes, J. Volz, M. S. Safronova, A. Rauschenbeutel, J. T. Barreiro, arXiv:2211.04004 (2022).

7. New Constraints on Dark Matter and Cosmic Neutrino Profiles through Gravity, Yu-Dai Tsai, Joshua Eby, Jason Arakawa, Davide Farnocchia, Marianna S. Safronova, arXiv:2210.03749 (2022).

8. Prospects of a thousand-ion Sn^{2+} Coulomb-crystal clock with sub-10^{-19} inaccuracy, David R. Leibrandt, Sergey G. Porsev, Charles Cheung, Marianna S. Safronova, arXiv:2205.15484 (2022).

9. New Measurement Resolves Key Astrophysical Fe XVII Oscillator Strength Problem, Steffen Kühn, Charles Cheung, Natalia S. Oreshkina, René Steinbrügge, Moto Togawa, Sonja Bernitt, Lukas Berger, Jens Buck, Moritz Hoesch, Jörn Seltmann, Florian Trinter, Christoph H. Keitel, Mikhail G. Kozlov, Sergey G. Porsev, Ming Feng Gu, F. Scott Porter, Thomas Pfeifer, Maurice A. Leutenegger, Zoltán Harman, Marianna S. Safronova, José R. Crespo López-Urrutia, and Chintan Shah, Phys. Rev. Lett. 129, 245001 (2022). Supplemental Material. Physics Viewpoint: Getting a Clearer View of Iron Emission Lines.

10. Calculation of energies and hyperfine-structure constants of $^{233}U^{+}$ and ^{233}U, S. G. Porsev, C. Cheung, and M. S. Safronova, Phys. Rev. A 106, 042810 (2022).

11. New Horizons: Scalar and Vector Ultralight Dark Matter, D. Antypas et al., arXiv:2203.14915 (2022).

12. Electric dipole moments and the search for new physics, Ricardo Alarcon et al., arXiv:2203.08103 (2022).

13. Snowmass 2021: Quantum Sensors for HEP Science – Interferometers, Mechanics, Traps, and Clocks, Oliver Buchmueller, Daniel Carney, Thomas Cecil, John Ellis, R. F. Garcia Ruiz, Andrew A. Geraci, David Hanneke, Jason Hogan, Nicholas R. Hutzler, Andrew Jayich, Shimon Kolkowitz, Gavin W. Morley, Holger Muller, Zachary Pagel, Christian Panda, Marianna S. Safronova, arXiv:2203.07250 (2022).

14. Cold Atoms in Space: Community Workshop Summary and Proposed Road-Map, Ivan Alonso et al., EPJ Quantum Technol. 9, 30 (2022).

15. Fundamental Physics with a State-of-the-Art Optical Clock in Space, Andrei Derevianko, Kurt Gibble, Leo Hollberg, Nathan R. Newbury, Chris Oates, Marianna S. Safronova, Laura C. Sinclair, Nan Yu, Quantum Sci. Technol. 7, 044002 (2022).

16. Measuring the stability of fundamental constants with a network of clocks, G. Barontini at al., EPJ Quantum Technology 9, 12 (2022).

17. Laser Spectroscopy of the y^7P_J states of Cr I, E. B. Norrgard, D. S. Barker, S. P. Eckel, S. G. Porsev, C. Cheung, M. G. Kozlov, I. I. Tupitsyn, and M. S. Safronova, Phys. Rev. A 105, 032812 (2022).

18. Magic wavelengths of the Sr ($5s^2\ ^1S_0 – 5s5p\ ^3P_1$) intercombination transition near the $5s5p\ ^3P_1 – 5p^2\ ^3P_2$ transition, Grady Kestler, Khang Ton, Dmytro Filin, Marianna S. Safronova, and Julio T. Barreiro, Phys. Rev. A 105, 012821 (2022).

19. Tests of Fundamental Physics, M. S. Safronova, book chapter, in press, Springer Handbook of Atomic, Molecular and Optical Physics (2nd ed.), edited by Gordon W. F. Drake and Shaun Steven.

20. Precision calculation of hyperfine constants for extracting nuclear moments of ^{229}Th, S.G. Porsev, M.S. Safronova, M.G. Kozlov, Phys. Rev. Lett. 127, 253001 (2021).

21. Measurement of the tune-out wavelength for ^{133}Cs at 880 nm, Apichayaporn Ratkata, Philip D. Gregory, Andrew D. Innes, Jonas A. Matthies, Lewis A. McArd, Jonathan M. Mortlock, M. S. Safronova, Sarah L. Bromley, Simon L. Cornish, Phys. Rev. A 104, 052813 (2021).

22. Quantum technologies and the elephants, M. S Safronova and Dmitry Budker, Quantum Sci. Technol. 6, 040401 (2021).

23. Low-lying energy levels of $^{229}Th^{35+}$ and the electronic bridge process, S. G. Porsev, C. Cheung and M. S. Safronova, Quantum Sci. Technol. 6, 034014 (2021).

24. Scalable codes for precision calculations of properties of complex atomic systems C. Cheung, M. S. Safronova, S. G. Porsev, Symmetry 13 (4), 621 (2021).

25. Role of triple excitations in calculating different properties of Ba+, S. G. Porsev, M. S. Safronova, Phys. Rev. A 103, 042815 (2021).

26. Nuclear clocks for testing fundamental physics, E. Peik, T. Schumm, M. S. Safronova, A. Pálffy, J. Weitenberg, and P. G. Thirolf, Quantum Sci. Technol. 6, 034002 (2021).

27. Observation of an electric quadrupole transition in a negative ion: Experiment and Theory, C. W. Walter, S. E. Spielman, R. Ponce, N. D. Gibson, J. N. Yukich, C. Cheung, and M. S. Safronova, Phys. Rev. Lett. 126, 083001 (2021).

28. Predicting quasibound states of negative ions: La- as a test case, M. S. Safronova, C. Cheung, M. G. Kozlov, S. E. Spielman, N. D. Gibson, and C. W. Walter, Phys. Rev. 103, 022819 (2021).

29. Magic wavelengths of the Yb ($6s^2\ ^1S_0$ - $6s6p\ ^3P_1$) intercombination transition, T. A. Zheng, Y. A. Yang, M. S. Safronova, U. I. Safronova, Zhuan-Xian Xiong, T. Xia, and Z.-T. Lu, Phys. Rev. A 102, 062805 (2020).

30. Precision measurement of the $^3D_1$ and $^3D_2$ quadrupole moments in Lu^+, R. Kaewuam, T. R. Tan, Zhiqiang Zhang, K. J. Arnold, M. S. Safronova, M. D. Barrett, Phys. Rev. A 102, 042819 (2020).

31. Hyperfine-mediated effects in a Lu+ optical clock, Zhiqiang Zhang, K. J. Arnold, R. Kaewuam, M. S. Safronova, M. D. Barrett, Phys. Rev. A 102, 052834 (2020).

32. Detection of missing low-lying atomic states in actinium, Ke Zhang, Dominik Studer, Felix Weber, Vadim M. Gadelshin, Nina Kneip, Sebastian Raeder, Dmitry Budker, Klaus Wendt, Tom Kieck, Sergey G. Porsev, Charles Cheung, Marianna S. Safronova, Mikhail G. Kozlov, Phys. Rev. Lett. 125, 073001 (2020).

33. Mass spectrometry for future atomic clocks, Marianna S. Safronova, Nature 581, 35 (2020).

34. State-dependent optical lattices for the strontium optical qubit, A. Heinz, A. J. Park, N. Šantic, J. Trautmann, S. G. Porsev, M. S. Safronova, I. Bloch, and S. Blatt, , Phys. Rev. Lett. 124, 203201 (2020).

35. Accurate prediction of clock transitions in a highly charged ion with complex electronic structure, C. Cheung, M. S. Safronova, S. G. Porsev, M. G. Kozlov, I. I. Tupitsyn, A. I. Bondarev, Phys. Rev. Lett. 124, 163001 (2020).

36. High-resolution photo-excitation measurements exacerbate the long-standing Fe XVII emission problem, Steffen Kühn et al., Phys. Rev. Lett. 124, 225001 (2020).

37. Optical clocks based on the Cf^{15+} and Cf^{17+} ions, S. G. Porsev, U. I. Safronova, M. S. Safronova, P. O. Schmidt, A. I. Bondarev, M. G. Kozlov, I. I. Tupitsyn, Phys. Rev. A 102, 012802 (2020).

38. Calculation of higher-order corrections to the light shift of the $5s^2\ {}^1S_0$ - $5s5p\ {}^3P_0$ clock transition in Cd, S. G. Porsev and M. S. Safronova, Phys. Rev. A 102, 012811 (2020).

39. Probing the Relaxed Relaxion at the Luminosity and Precision Frontiers, Abhishek Banerjee, Hyungjin Kim, Oleksii Matsedonskyi, Gilad Perez, Marianna S. Safronova, J. High Energy Phys. 2020, 153 (2020).

40. Magic wavelength of the $^{138}Ba^+$ $6s\ {}^2S_{1/2}$ – $5d\ {}^2D_{5/2}$ clock transition, S. R. Chanu, V. P. W. Koh, K. J. Arnold, R. Kaewuam, T. R. Tan, Zhiqiang Zhang, M. S. Safronova, M. D. Barrett, Phys. Rev. A, 101, 042507 (2020).

41. Branching fractions for $P_{3/2}$ decays in Ba^+, Zhiqiang Zhang, K. J. Arnold, S. R. Chanu, R. Kaewuam, M. S. Safronova, M. D. Barrett, Phys. Rev. A 101, 062515 (2020).

42. Combining experiments and relativistic theory for establishing accurate radiative quantities in atoms: The lifetime of the $^2P_{3/2}$ state in $^{40}Ca^+$, Ziv Meir, Mudit Sinhal, Marianna S. Safronova, and Stefan Willitsch, Phys. Rev. A 101, 012509 (2020).

43. Measurement of the $7p\ {}^2P_{3/2}$ state branching fractions in Ra^+, M. Fan, C. A. Holliman, S. G. Porsev, M. S. Safronova, and A. M. Jayich, Phys. Rev. A 100, 062504 (2019).

44. High-precision measurement and ab initio calculation of the $(6s^26p^2)\ {}^3P_0$-${}^3P_2$ electric quadrupole transition amplitude in ^{208}Pb, Daniel L. Maser, Eli Hoenig, B. -Y. Wang, P. M. Rupasinghe, S. G. Porsev, M. S. Safronova, and P. K. Majumder, Phys. Rev. A 100, 052506 (2019).

45. Narrow-line cooling and determination of magic wavelength of Cd, A. Yamaguchi, M. S. Safronova, K. Gibble, and H. Katori, Phys. Rev. Lett. 123, 113201 (2019).

46. Suppressing inhomogeneous broadening in a lutetium multi-ion optical clock, Ting Rei Tan, Rattakorn Kaewuam, Kyle J. Arnold, Sapam R. Chanu, Zhiqiang Zhang, Marianna Safronova, and Murray D. Barrett, Phys. Rev. Lett. 123, 063201 (2019).

47. Frequency shifts due to Stark effects on a Rb two-photon transition, Kyle W. Martin, Benjamin Stuhl, Jon Eugenio, Marianna S. Safronova, Gretchen Phelps, John H. Burke, and Nathan D. Lemke, Phys. Rev. A 100, 023417 (2019).

48. On the polarizability assessments of ion-based optical clocks, M. D. Barrett, K. J. Arnold, and M. S. Safronova, Phys. Rev. A 100, 043418 (2019).

49. Measurements of the branching ratios for $6P_{1/2}$ decays in $^{138}Ba^+$, K. J. Arnold, S. R. Chanu, R. Kaewuam, T. R. Tan, L. Yeo, Zhiqiang Zhang, M. S. Safronova, and M. D. Barrett, Phys. Rev. A 100, 032503 (2019).

50. Optical clock comparison for Lorentz symmetry testing, Christian Sanner, Nils Huntemann, Richard Lange, Christian Tamm, Ekkehard Peik, Marianna S. Safronova, Sergey G. Porsev, Nature 567, 204 (2019).

51. Visible spectra of heavy ions with an open 4f shell, S. Murata, M. S. Safronova, U. I. Safronova, and N. Nakamura, X-Ray Spectrometry 3097, 1 (2019).

52. Electric dipole matrix elements for the 6p $^2P_J \rightarrow 7s\ ^2S_{1/2}$ transition in atomic cesium, George Toh, Amy Damitz, Nathan Glotzbach, Jonah Quirk, I. C. Stevenson, J. Choi, M. S. Safronova, and D. S. Elliott Phys. Rev. A 99, 032504 (2019).

53. Dynamic polarizability measurements with $^{176}Lu^+$, K. J. Arnold, R. Kaewuam, T. R. Tan, S. G. Porsev, M. S. Safronova, M. D. Barrett, Phys. Rev. A 99, 012510 (2019).

54. The search for variation of fundamental constants with clocks, M. S. Safronova, topical review, Annalen der Physik 1800364, Special Issue *The Revised SI: Fundamental Constants, Basic Physics and Units* (2019).

55. Alkaline earth atoms in optical tweezers, Alexandre Cooper, Jacob P. Covey, Ivaylo S. Madjarov, Sergey G. Porsev, Marianna S. Safronova, Manuel Endres, Phys. Rev. X 8, 041055 (2018). Physics Viewpoint: Alkaline Atoms Held with Optical Tweezers, Physics 11, 135 (2018).

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Invited Talks (2004 - 2023)

1. GGI Lectures on the Theory of Fundamental Interactions 2023, winter school, five lectures, January 2023.

2. Quantum sensors in space for new-physics discoveries, NASA Quantum Sensing talk, NASA Headquarters, Washington DC, December 7, 2022.

3. Quantum Technologies for New-physics Searches in the Laboratory and in Space, Physics department colloquium, Colorado State University, December 5, 2022.

4. Adventures in the Science Land, From Atomic Structure to Bose Condensates: A 40-year NIST journey with Charles Clark, NIST, Gaithersburg, December 2, 2022.

5. Quantum sensors in the laboratory and in space for new-physics discoveries, The International Conference on Quantum Systems in Extreme Conditions (QSEC2022), Bingen, Germany, November 16, 2022.

6. Quantum sensors in space for dark matter detection, PIKIMO 13, Cincinnati, Ohio, November 12, 2022.

7. Quantum Technologies for New-physics Searches in the Laboratory and in Space, Physics Department seminar, UC Berkeley, November 9, 2022.

8. Optical clocks in space for new-physics discoveries, QUP workshop: toward Project Q (online talk), Tokyo, Japan, November 7-8, 2022.

9. 2022 Nobel prize in physics, Nobel prize symposium, University of Delaware public lecture, November 1, 2022.

10. Quantum sensors for new physics discoveries in the laboratory and in space, Physics World Webinar: Quantum sensors for new-physics discoveries, IOP Publishing (online), October 10, 2022, https://physicsworld.com/a/quantum-sensors-for-new-physics-discoveries.

11. Atomic and Nuclear Clocks for New-physics Discoveries in the Laboratory and in Space, Quantum sensors and tests of new physics (QSNP 2022), Hannover, Germany, October 5 – 7, 2022.

12. Optical clocks in space for new-physics discoveries, NASA Quantum Sensing Workshop, Newport News, September 27 - 29, 2022.

13. Quantum Technologies for New-physics Discoveries, 45th Annual Meeting NNV AMO (online talk), September 2022.

14. Searches for new physics with atomic and nuclear clocks in the laboratory and in space, LISA summer school: Structure of Complex Atoms, (online talk), September 6, 2022.

15. Search for new physics with highly charged ions, 20th International Conference on the Physics of Highly Charged Ions (HCI), Matsue, Japan (online talk), August 29 – September 3, 2022.

16. New observables of ultralight dark matter, Ultralight Dark Matter, Bad Honnef Physics School, Bad Honnef, Germany, August 2022.

17. Phenomenology of dark matter and emerging detection modalities, Ultralight Dark Matter Bad Honnef Physics School, Bad Honnef, Germany, August 2022.

18. Clocks in space, precision sensing, and contributing science and technology, 2022 Q-SEnSE Annual Meeting (online), June 29-30.

19. Highly charged ions for dark matter searches, TRIUMF seminar, Vancouver, Canada, July 2022.

20. Ultralight New Physics (two lectures), The 2022 Tri-Institute Summer School on Elementary Particles, Vancouver, Canada, July 2022.

21. Searches for New Physics with Quantum Sensors in the Laboratory and in Space, Ninth Meeting on CPT and Lorentz symmetry (online), May 2022.

22. Parity Violation in Atoms Precision Tests with Neutral-Current Coherent Interactions with Nuclei workshop, Mainz, Germany (online talk), May 2022.

23. Searches for New Physics with Quantum Sensors in the Laboratory and in Space, UCSB Department of Physics colloquium, Santa Barbara, CA, May 2022.

24. Searches for New Physics with Quantum Sensors in the Laboratory and in Space, Caltech Colloquium, Pasadena, CA, May 2022.

25. Atomic and Nuclear Clocks for New-physics Discoveries, JPL Offices of Chief Scientist and Chief Technologist Seminar series, Pasadena, CA, May 2022.

26. Dark matter searches with 229mTh isomer, EMMI workshop 100 Years of Nuclear Isomers, Berlin, Germany, May 2022.

27. Searches for New Physics with Quantum Sensors in the Laboratory and in Space, WE-Heraeus-Seminar: High-Precision Measurements and Searches for New Physics, Bad Honnef, Germany, May 2022.

28. Atomic theory for nuclear properties and new physics searches, ECT workshop: Nuclear physics from atomic spectroscopy (online), May 2022.

29. What would you do with a 1000 qubits?, Quantum Information and Computing Seminar, Department of Mathematical Sciences, University of Delaware, April 26, 2022

30. Searches for New Physics with Quantum Sensors in the Laboratory and in Space, New methods and ideas at the frontiers of particle physics conference, Aspen, CO, April 2022.

31. Searches for New Physics with Quantum Sensors in the Laboratory and in Space, QSNET seminar (online), April 5, 2022.

32. Searches for New Physics with Quantum Sensors in the Laboratory and in Space, Virtual AMO Seminar Series (online), March 4, 2022.

33. Searches for New Physics with Quantum Sensors in the Laboratory and in Space, CQRT seminar, University of Oklahoma (online), March 1, 2022.

34. Searches for New Physics with Quantum Sensors in the Laboratory and in Space, Joint Pitt/CMU Physics and Astronomy Colloquium (online), January 31, 2022.

35. Solving astrophysics puzzle and future QED tests with Fe^{16+}, Department of Quantum Mechanics Seminar, University of St. Petersburg (online), December 11, 2021.

36. Atomic and nuclear clocks for ultralight dark matter detection, 2021 UC Irvine Journal Club (online), December 3, 2021.

37. Dark Matter detection with a nuclear clock, Thorium Clock virtual science table 2021 (online), December 3, 2021.

38. Quantum Technologies for New-physics Discoveries, Physics colloquium, TU Darmstadt (online), November 12, 2021.

39. New physics searches with clocks on the ground and in space, Third International online school "Atomic and nuclear time and frequency standards", Moscow, Russia, October 27, 2021.

40. Recent progress in Th ion theory for the nuclear clock and online data portal, Third International online school "Atomic and nuclear time and frequency standards", Moscow, Russia, October 27, 2021.

41. Quantum Sensors for New-physics Discoveries, 2021 CPS-IOP Joint Session on QIS (online), October 23, 2021.

42. Quantum Technologies for New-physics Discoveries, Quantum enabled S&T (QuEST), Theme III - Quantum Information Technologies with Ion-trap and Optical Lattice Devices, India (online), October 8, 2021

43. Quantum Technologies for New-physics Discoveries, Department of Physics Colloquium, University of Maryland, October 5, 2021

44. Novel Clocks for New Physics Searches, JQI seminar, October 4, 2021

45. From dark matter searches to online data portal, Q-SEnSE annual meeting, online, July 21, 2021.

46. Dark matter searches with atomic and nuclear clocks, 16th Marcel Grossmann Meeting, online, July 8, 2021.

47. Clock with Radioactive Species for New Physics Searches, New Opportunities for Fundamental Physics Research with Radioactive Molecules workshop, online, July 1, 2021.

48. Quantum Technologies for New-physics Searches, Planck 2021, 23rd International Conference From the Planck scale to the Electroweak scale, online, June 30, 2021.

49. Clocks in space for new physics searches, Biological and Physical Sciences (BPS) Division of NASA's Science Mission Directorate (SMD) Clocks in Space Workshop, online, June 17, 2021.

50. Quantum Technologies for New-physics Discoveries, 26th International Symposium on Particle Physics, String Theory, and Cosmology (PASCOS), online (South Korea), June 2021.

51. Asking big-picture questions using atomic and nuclear clocks, DAMOP 2021, online, June 2021.

52. New developments in theory of actinides and online data portal, 2021 Workshop: Atomic Structure of Actinides & Related Topics, online (Germany), May 2021.

53. Fundamental physics with atoms and molecules, KITP Exploration meeting on Novel Experiments for Fundamental Physics, online, May 2021.

54. Advances in atomic theory of heavy elements for neutron star merges, April meeting, online, April 2021.

55. Novel ionic, atomic and molecular systems, ECFA Detector R&D Roadmap Symposium of Task Force 5 Quantum and Emerging Technologies, online, April 2021.

56. Quantum Sensors for New-physics Discoveries, University of Waterloo Colloquium (online), March 2021.

57. Dark matter searches with quantum sensors, Aspen Center for Physics, A Rainbow of Dark Sectors (online), March 2021.

58. Search for physics beyond the Standard Model with atomic and nuclear clocks, High energy theory group seminar, University of Sussex, UK, December 14, 2020.

59. Fundamental physics with atomic clocks and atom interferometry in space, Fundamental Physics kickoff meeting for NASA BPS decadal survey, December 3, 2020.

60. Dark Matter Searches with Atomic and Nuclear Clocks, Virtual Quantum Science Seminar, November 12, 2020.

61. Dark matter searches with atomic and nuclear clocks, International online school "Atomic and nuclear time and frequency standards - 2020", Moscow, Russia, October 26, 2020.

62. Atomic/nuclear Clocks and Precision Spectroscopy Measurements for Dark Matter and Dark Sector Searches, Snowmass Community Planning Meeting (virtual), Plenary: Voices from the Community Town Hall, October 5, 2020.

63. Atomic/nuclear Clocks and Precision Spectroscopy Measurements for Dark Matter and Dark Sector Searches, Rare Precision Frontier Townhall, October 2, 2020.

64. Atomic Clocks for Fundamental Physics: Time for Discovery, 60th Meeting of the Civil GPS Service Interface Committee, September 22, 2020.

65. Searches for new physics with atoms and molecules, TRIUMF Virtual Science Week, plenary talk, August 19, 2020.

66. Atomic and Nuclear Clocks for Dark Matter Searches, Department of Physics and Astronomy Virtual Seminar, University of Oklahoma, July 1, 2020.

67. Searches for new physics with atoms and molecules, Virtual Seminar on Precision Physics and Fundamental Symmetries, May 28, 2020.

68. Quantum Sensors for New-physics Discoveries, CLEO 2020 Tutorial, virtual conference, May 11, 2020.

69. Atomic Clocks for Dark Matter Searches, Fermilab Joint Experimental-Theoretical Physics Seminar, March 6, 2020

70. Atomic Clocks for Fundamental Physics - Time for Discovery, Physics Colloqquium, Harvard, March 2, 2020.

71. Community Portal for High-Precision Atomic Physics Data and Computation, 2020 NSF cyberinfrastructure for sustained scientific innovation (CSSI) principal investigator meeting, February 13, 2020.

72. Searches for new physics with atoms and molecules, Imperial College Seminar, London, January 23, 2020.

73. Atomic Clocks for New Physics Searches, New Physics on the low-energy precision frontier workshop, CERN, Geneva, January 22, 2020.

74. Atomic Clocks for Fundamental Physics - Time for Discovery, 12th Annual Symposium of the Centre for Quantum Technologies (CQT), Singapore, January 16, 2020.

75. EDMs, Ions, atoms and molecular probes of New Physics (three remote lectures), School on Quantum Sensors for Fundamental Physics, Duhram, UK, January 8, 2020.

76. An Online portal for high-precision atomic physics data and Computation, Workshop: A Science Gateway for Atomic and Molecular Physics, NIST, Gaithersburg, December 11-13, 2019.

77. Search for variation of fundamental constants and dark matter with atomic clocks, International School "Time and frequency standards based on atomic and nuclear transitions", Moscow, Russia, October 23-25, 2019.

78. Part 2, Ultralight dark matter, International School "Time and frequency standards based on atomic and nuclear transitions", Moscow, Russia, October 23-25, 2019.

79. Introduction to dark matter, Part 1, International School "Time and frequency standards based on atomic and nuclear transitions", Moscow, Russia, October 23-25, 2019.

80. Searches for new physics with atoms and molecules, University of Basel Seminar, Basel, Switzerland, October 21, 2019.

81. Fundamental symmetries and exotic physics in atoms, Physics of Fundamental Symmetries and Interactions (PSI), Paul Scherrer Institute, Switzerland, October 20-25, 2019.

82. New physics searches with atomic clocks, Next Frontiers in the Search for Dark Matter, GGI, Florence, Italy, September 23-27, 2019.

83. Variation of fundamental constants and the current status of atomic theory, Royal Observatory of Belgium, Brussels, Belgium September 11, 2019.

84. Precision-measurement Searches for New Physics – Time for Discovery, plenary talk, International conference on Quantum, Atomic, and Molecular Physics (QuAMP), Birmingham, UK, September 2-5, 2019.

85. Search for Lorentz symmetry violation with trapped ions, The 2nd North American Conference on Trapped Ions (NACTI), College Park, MD, July 22-26 2019.

86. Precision Tests of Fundamental Physics - Time for Discovery, USTC Seminar, Fudan, China, June 26, 2019.

87. Community portal for high-precision atomic physics data and computation, 13th International Colloquium on Atomic Spectra and Oscillator Strengths for Astrophysical and Laboratory Plasmas, Shanghai, China, June 23-27, 2019.

88. How to detect dark matter? Part 2: Ultralight dark matter, International Summer School "Search for new physics with low-energy precision tests", Ameland, Netherlands, June 16 - 21, 2019.
89. How to detect dark matter? Part 1: Introduction, International Summer School "Search for new physics with low-energy precision tests", Ameland, Netherlands, June 16 - 21, 2019.

90. Search for New Physics with Atoms and Molecules, International Summer School "Search for new physics with low-energy precision tests", Ameland, Netherlands, June 16 - 21, 2019.

91. Atomic Clocks for New Physics Searches, Atomic Physics Gordon Research Conference, Newport, RI, June 9 - 14, 2019

92. Predicting atomic properties of superheavy elements, PLATAN 2019 - International Conference Merger of the Poznan Meeting on Lasers and Trapping Devices in Atomic Nuclei Research and the International Conference Series on Laser Probing, Helmholtz Institute Mainz, Germany, 19-24 May 2019.

93. How to detect dark matter?, Max Planck Institute for Nuclear Physics (MPIK) Seminar, Heidelberg, Germany, May 22, 2019.

94. Testing Lorentz invariance with atomic clocks, Eighth Meeting on CPT and Lorentz Symmetry, Indiana University, Bloomington, May 12-16, 2019.

95. QSE curriculum description, Quantum Science and Engineering Workshop, University of Delaware, Newark, DE, April 29, 2019.

96. Precision tests of fundamental physics – time for discovery, Inauguration Symposium of the MPG-PTB-RIKEN Center for Time, Constants, and Fundamental Symmetries, RIKEN, Tokyo, Japan, April 8, 2019.

97. How to detect dark matter?, NIST Seminar, Boulder, CO, March 11, 2019.

98. Two clock transitions in neutral Yb for the highest sensitivity to variations of the fine-structure constant, APS March meeting, Boston, MA, March 8, 2019.

99. Probing new physics with atomic clocks, 1st Arizona Workshop on Precision Searches for Fundamental Physics, February 6, 2019.

100. Probing new physics with atomic clocks, Center for Fundamental Physics Colloquia, Northwestern University, January 8, 2019.

101. Probing new physics with atomic clocks, Light Dark World International Forum, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea, December 17, 2018.

102. Probing new physics with atomic clocks, DQ-mat Colloquium, PTB, Braunschweig, Germany, December 13, 2018.

103. Search for new physics with trapped ions, European Conference on Trapped Ions (ECTI), the Weizmann Institute of Science, November 19, 2018.

104. Atomic Clocks and their Applications, 2018 Annual Meeting of the APS Mid-Atlantic Section, College Park, MD, November 10, 2018.

105. Searches for the violation of Lorentz invariance with atomic systems, Discrete Symmetries in Particle, Nuclear and Atomic Physics and implications for our Universe, Trento, Italy, October 8, 2018.

106. Search for New Physics with Trapped Charged Atoms and Molecules, 7th International Conference on Trapped Charged Particles and Fundamental Physics, Traverse City, MI, October 4, 2018.

107. Two clock transitions in neutral Yb for the highest sensitivity to variations of the fine-structure constant, 7th International Workshop on Ultra-cold Group II Atoms, Beijing, China, October 1, 2018.

108. Development of a relativistic atomic code for accurate treatment of complex correlations, HPC Symposium, University of Delaware, Newark, DE, September 26, 2018.

109. Relativistic high-precision methodologies for atomic calculations, International Conference on Few-Body Problems in Physics, Caen, France, July 13, 2018.

110. Novel atomic clocks and the search for new physics, WE Heraeus-Seminar "Novel optical clocks in atoms and nuclei", Bad Honnef, Germany, July 11, 2018.

111. Novel atomic clocks and the search for new physics, MG15, Rome, Italy, July 5, 2018.

112. Atomic Clocks in the Next Quantum Revolution, NSF Distinguished Lecture Series in Mathematical and Physical Sciences, Alexandria, VA June 25, 2018.

113. Proposal of a new method for tests of Lorentz invariance with atomic systems, IUCSS Workshop on the Standard-Model Extension, Bloomington, IN, June 22, 2018.

114. Tests of Lorentz symmetry with clocks and trapped ions, IUCSS Summer School on the Standard-Model Extension, Bloomington, IN, June 20, 2018.

115. Introduction: Precision-measurement searches for new physics, Third annual workshop of the Group on Precision Measurements and Fundamental Constants, Ft. Lauderdale, Florida, May 28, 2018.

116. The search for variation of fundamental constants with atomic systems, WE Heraeus-Seminar "Fundamental Constants: Basic Physics and Units", Bad Honnef, Germany, May 14, 2018.

117. Searching for BSM Physics with atoms and molecules, KITP Conference: New probes for physics beyond the Standard Model, Santa Barbara, April 12, 2018.

118. Dark matter searches and laser physics, High Energy Density Science Center seminar, Lawrence Livermore National Laboratory, April 5, 2018.

119. The search for new physics with atoms and molecules, KITP Program: High energy physics at the sensitivity frontier, Santa Barbara, March 28, 2018.

120. Search for new physics with atomic clocks, Denison University, Physics Department Colloquium, Ohio, March 9, 2018.

121. Search for new physics with atomic clocks, The Center for Ultracold Atoms, Seminar, Harvard, Cambridge, December 12, 2017.

122. Searching for BSM physics with highly charged ions, BSM in direct, indirect and tabletop experiments, November 12-16, 2017, Weizmann Institute of Science, Israel.

123. Search for new physics with atomic clocks, Temple University, Physics Department Colloquium, Philadelphia, November 6, 2017.

124. Longrange interactions in Sr-Sr, Yb-Yb, Yb-alkali, and Yb-group II dimers, WE-Heraeus-Seminar: Longrange interactions, Bad Honnef, Germany, October 25, 2017

125. Actinide Highly-Charged Ions for Tests of Fundamental Physics and Predicting Atomic Properties of Superheavy Atoms, GSI seminar, Germany, October 24, 2017

126. Atomic theory for searches of Lorentz violation, changing couplings, and dark matter, Developing New Tools for Dark Matter Searches workshop, Aspen Center for Physics, Colorado, September 5, 2017.

127. Laser cooling of negative ions, 1st North American Conference on Trapped Ions, Boulder, Colorado, August 14 - 18, 2017.

128. Dark matter searches: from WIMPs to axions. Part II, Neutron Physics Group seminar, NIST, Gaithersburg, July 25, 2015.

129. Dark matter searches: from WIMPs to axions. Part I, Neutron Physics Group seminar, NIST, Gaithersburg, June 27, 2015.

130. High-precision calculation of La^- atomic properties for anion laser cooling, Precision Physics, Quantum Electrodynamics and Fundamental Interactions conference, IESC Cargese, Corsica, France, April 30 - May 5, 2017

131. Dark matter searches: from WIMPs to axions, JILA Seminar, University of Colorado, Boulder, April 20, 2017.

132. Testing the fundamental symmetries of Nature with atoms, Physics Colloquium, Colorado State University, Fort Collins, April 19, 2017.

133. New developments in theoretical atomic clock research, NIST Seminar, Boulder, April 14, 2017.

134. Search for new physics with atomic clocks, JILA Colloquium, University of Colorado, Boulder, April 13, 2017.

135. The search for variation of fundamental constants with highly charged ions, ISOQUANT workshop: Isolated quantum systems and universality in extreme conditions, Obergurgl, Austria, 19-24 February 2017.

136. Search for variation of fundamental constants, MS&T physics colloquium, Rolla, September 29, 2016.

137. Search for new physics with highly charged ions, European Conference on Trapped Ions, Arosa, Switzerland, August 29 - September 2, 2016.

138. Search for new physics with atomic clocks, 25th International Conference on Atomic Physics, ICAP 2016, Seoul, Korea, July 24 - 29, 2016.

139. Strongly enhanced effects of Lorentz symmetry violation in Yb+ and highly-charged ions, the Seventh Meeting on CPT and Lorentz Symmetry, Bloomington, June 20-24, 2016.

140. Rydberg atoms for quantum information and precision measurements, OIST Mini Symposium "Rydberg Atoms for Quantum Technologies", Okinawa, Japan, March 3-5, 2016.

141. Group II atoms: atomic clocks, long-range interactions, and precision measurements, the 6th International Workshop on Ultracold Group II atoms, Paris, France, February 22 - 24, 2016.

142. Precision measurements for tests of Lorentz symmetry and search for alpha-variation, ERATO International Workshop: Challenges in Precision Science, Tokyo, Japan, January 26, 2016.

143. Tests of Lorentz Symmetry with Entangled Ions, Heidelberg Physics Colloquium, Heidelberg, Germany, January 22, 2016.

144. Highly-charged Ions: Opportunities for Tests of Fundamental Physics, Max-Planck-Institut für Kernphysik, Heidelberg, Germany, January 20, 2016.

145. Highly-Charged Ions for Atomic Clocks, Search for the Variation of the Fine-Structure Constant, and Quantum Information, The Winter Colloquium on the Physics of Quantum Electronics, Snowbird, Utah, January 8, 2016.

146. Search for New Physics with Atoms and Molecules, Physics Colloquium, University of Kentucky, Lexington, November 6, 2015.

147. Tests of Lorentz Symmetry with Atomic Systems, Nuclear and atomic physics seminar, University of Kentucky, Lexington, November 6, 2015.

148. Magic Wavelengths and Their Applications, CM - AMO Seminar, University of Michigan, Ann Arbor, October 6, 2015.

149. Atomic clocks and their applications, Neutron Physics Group seminar, NIST, Gaithersburg, July 21, 2015.

150. Search for new physics with atoms and molecules, 47th Conference of the European Group on Atomic Systems, EGAS (plenary talk), Riga, Latvia, July 2015.

151. Highly-charged ions for atomic clocks, search for variation of the fine-structure constant, and tests of Lorentz symmetry, Fourteenth Marcel Grossmann Meeting, MG14, Rome, July 2015.

152. Atomic clocks and variation of fundamental constants, Atomic seminar, Physics Department, University of Virginia, Charlottesville, VA, July 8, 2015.

153. Highly-charged ions for atomic clocks, search for alpha-variation and tests of Lorentz symmetry, International Conference on Laser Spectroscopy, ICOLS, Singapore, June 2015.

154. Symmetry violations in atoms and molecules, 6th International Symposium on Symmetries in Subatomic Physics, SSP, Victoria, Canada, June 2015.

155. AMO tests of fundamental symmetries and search for the physics beyond the standard model, Twelfth Conference on the Intersections of Particle and Nuclear Physics, CIPANP, Vail, CO, May 2015.

156. Tests of fundamental symmetries: introduction and overview, TFS workshop, APS Topical Group on Precision Measurements and Fundamental Constants and the Few-body Topical Group, Baltimore, April 2015.

157. Adventures in atomic physics: from quantum computers to dark matter, University of Delaware, Zone 3 Society of Physics students meeting, April 25, 2015.

158. Search for new physics with atoms and molecules, University of Mainz Physics colloquium, Mainz, Germany, February 3, 2015.

159. A Test of Lorentz invariance with Ca+ ions and future perspectives, Max-Planck-Institut für Kernphysik, Heidelberg, Germany, January 30, 2015.

160. Search for new physics with atoms and molecules, Center of Quantum Dynamics colloquia, University of Heidelberg, Heidelberg, Germany, January 29, 2015.

161. Atomic clocks and the search for variation of fundamental constants, Institut für Quantenoptik, University of Hannover, Hannover, Germany, January 22, 2015.

162. Search for new physics with atoms and molecules, CAMP Seminar, Penn State, November 11, 2014.

163. Anapole moments and the search for EDM, Nuclear Physics Seminar, Indiana University, Bloomington, October 31, 2014.

164. Search for new physics with atoms and molecules, Physics Colloquium, Indiana University, Bloomington, October 29, 2014.

165. Search for new physics with atoms and molecules, Chemistry Department Colloquium, University of Warsaw, Poland, October 2, 2014.

166. Atomic clocks, Nicolaus Copernicus University, Torun, Poland, September 30, 2014.

167. Fundamental symmetries and the search for new physics with atoms and molecules, Physikalisch-Technische Bundesanstalt, Berlin, Germany, September 26, 2014.

168. Atomic clocks and the search for variation of fundamental constants, Physikalisch-Technische Bundesanstalt, Braunschweig, Germany, September 25, 2014.

169. Highly-charged ions for atomic clocks and search for the variation of the fine-structure constant, Max-Planck-Institut für Kernphysik, Heidelberg, Germany, September 24, 2014.

170. Precision calculations of atomic properties, ICAMDATA conference, Jena, Germany, September 22, 2014.

171. Highly-charged ions for atomic clocks, search for the variation of the fine-structure constant, and quantum information, 17th International Conference on the Physics of Highly Charged Ions, September 4, 2014.

172. The proton radius puzzle, Neutron Physics Group seminar, NIST July 29, 2014.

173. Search for EDMs with atoms and molecules, Neutron Physics Group seminar, June 24, 2014.

174. Atomic clocks, fundamental symmetries, and the search for new physics, DAMOP, Madison, Wisconsin, June 2–6, 2014.

175. Highly-charged ions for atomic clocks, cosmology, and quantum information, AMO seminar, University of California Berkeley, March 21, 2014.

176. Atomic calculations for the development of future technology, SPS meeting, University of Delaware, March 5, 2014.

177. Atomic clocks, fundamental symmetries, and the search for new physics, University of Wisconsin-Madison, Atomic Seminar, Madison, September 10, 2013.

178. The search for new physics with atomic systems, Gordon Research Conference on Atomic Physics, Newport, RI, June 2013.

179. Atomic Parity Violation - new developments, workshop of the APS Topical Group on Hadronic Physics, Denver, Colorado April 2013.

180. Atomic clocks and the search for variation of fundamental constants, NIST seminar, Boulder, Colorado, October 30, 2012.

181. Atomic clocks, ultracold atoms, and fundamental symmetries, Physics Department Colloquium, University of Notre Dame, Notre Dame, Indiana, October 24, 2012.

182. Ytterbium in quantum gases and atomic clocks: van der Waals interactions and blackbody shifts, International workshop on ultracold group II atoms, Tokyo, Japan, October 2012.

183. Applications of quantum mechanics: from study of fundamental interactions to future technologies, Theory and Applications of Computational Chemistry Congress, Pavia, Italy, September 2012.

184. The study of fundamental symmetries with heavy atoms, International Conference on Relativistic Effects in Heavy Elements - Chemistry and Physics (REHE), Corrientes, Argentina, September 2012.

185. Atomic clocks and the search for variation of fundamental constants, The National Physical Laboratory, UK, July 20, 2012.

186. The search for new physics with atomic systems, Neutron Physics Group, NIST, June 26, 2012.

187. The World of Quantum Information, St. Petersburg Electrotechnical Institute (LETI), Department of Electronics, May 22, 2012.

188. Fundamental symmetries, atomic clocks and quantum computers, St. Petersburg University, Quantum Mechanics Division, Petergof, Russia, May 18, 2012.

189. Atomic calculations for studies of fundamental symmetries and atomic clock research, St. Petersburg Institute of Nuclear Physics, Gatchina, Russia, May 17, 2012.

190. The search for new physics with atomic systems, AMO seminar, University of California, Berkeley, March 21, 2012.

191. Atomic clocks and the search for variation of fundamental constants, Joint Quantum Institute Seminar, NIST and University of Maryland, March 5, 2012.

192. Atomic parity violation, Oak Ridge National Lab, Physics Division Seminars, December 8, 2011.

193. Atomic Calculations for Future Technology and Study of Fundamental Problems, Rowan University colloquium, November 18, 2011.

194. Atomic calculations for tests of fundamental physics, Physics Department, University of Virginia colloquium, November 11, 2011, Charlottesville, VA.

195. Atomic parity violation and implications for searches for physics beyond the standard model, Jefferson Lab theory seminar, October 24, 2011, Newport News, VA.

196. Coupled-cluster method for atomic clock research (keynote talk), Ninth International Conference of Computational Methods in Sciences and Engineering (ICCSME), Halkidiki, Greece, October 2-7, 2011.

197. Atomic calculations for studies of fundamental symmetries and atomic clock research, invited talk, Precision Measurements with Ultracold Molecules ITAMP workshop, September 26 - 30, 2011, Cambridge, MA, USA.

198. Atomic Calculations for Future Technology and Study of Fundamental Problems, M. S. Safronova, Colloquium at the Department of Physics, University of Nevada, Reno, March 22, 2011.

199. Atomic Polarizabilities (keynote talk), Eighth International Conference of Computational Methods in Sciences and Engineering (ICCSME), Kos, Greece, October 3-8, 2010.

200. Atomic Polarizabilities for Study of Fundamental Problems and Future Technology, Colloquium at the Department of Physics, University of Arizona, September 10, 2010.

201. Atomic calculations for tests of fundamental physics,10th International Colloquium on Atomic Spectra and Oscillator Strengths for Astrophysical and Laboratory Plasmas, Berkeley, California, August 2010.

202. Combining CI and all-order methods for studies of fundamental symmetries, Variation of fundamental constants and violation of fundamental symmetries P, T(EDM), CPT, Lorentz invariance workshop, Cairns, 24-25 July, 2010.

203. Atomic calculations: recent advances and modern applications, Joint Quantum Institute Seminar, Maryland, July 2010.

204. Atomic Calculations for Future Technology and Study of Fundamental Problems, Georgia Tech School of Physics colloquium, November 11, 2009.

205. Atomic Calculations for Future Technology and Study of Fundamental Problems (keynote talk), International Conference of Computational Methods in Sciences and Engineering, Rhodos, Greece, October 30, 2009.

206. Blackbody radiation shifts and Theoretical contributions to atomic clock research, 2009 IEEE International Frequency Control, Besancon, France, April 2009.

207. Application of the Atomic Calculations: from Fundamental Symmetries to Atomic Clocks JILA seminar, Boulder, CO, January 14, 2009.

208. The World of Quantum Information, School of Chemistry seminar, Tel Aviv University, Israel, November 16, 2008.

209. Development of the CI + all-order method and its applications, School of Chemistry seminar, Tel Aviv University, Israel, November 9, 2008.

210. Fundamental Symmetries, Atomic Clocks, and Magic Wavelength, AMO seminar, Physics Department, Penn State, October 14, 2008.

211. The World of Quantum Information, Signal Processing and Communications seminar series, Department of Electrical and Computer Engineering, University of Delaware, October 6, 2008.

212. Fundamental Symmetries, Atomic Clocks, and Magic Wavelength, Physics Department Colloquium, University of Toledo, October 2, 2008.

213. New directions in atomic PNC, “Beyond the Non-Relativistic Schrödinger Equation - From the Dirac Equation to Electroweak Theory" meeting, September 11, Auckland, New Zealand (2008).

214. Polarizabilities, Atomic Clocks, and Magic Wavelengths, University of Auckland Physics Department seminar, September 10, Auckland, New Zealand (2008)

215. Development of the CI + all-order method for atomic calculations, Atomic, Chemical, and Nuclear Developments in Coupled Cluster Methods workshop, Seattle, Washington, July 2008.

216. Atomic PNC theory: current status and future prospects, KVI seminar, Groningen, Netherlands, June 27, 2008.

217. Fundamental symmetries, atomic clocks, and magic wavelengths, Physique des interactions ioniques et moleculaires laboratory seminar, CNRS-Universite de Provence, Marseille, France, June 23, 2008.

218. Polarizabilities, Atomic Clocks, and Magic Wavelengths, DAMOP, State College, Pennsylvania, May 2008.

219. Applications of the All-order Method: From Parity Violation to Atomic Clocks, A Symposium on Atomic Physics: A Tribute to Walter Johnson, University of Notre Dame, April 5, 2008.

220. Atomic PNC theory: current status and future prospects, AMO seminar, University of California, Berkeley, March 18, 2008.

221. Symbolic and Numeric Scientific Computing for Atomic Physics, Computational Science Initiative Meeting, University of Delaware, November 9, 2007.

222. Polarizabilities, atomic clocks, and magic wavelength, Joint Atomic Physics Colloquium, Institute for Theoretical Atomic and Molecular Physics and Harvard University Physics Department, Cambridge, October 17, 2007.

223. Atomic PNC theory: current status and future prospects, Rare Isotopes and Fundamental Symmetries workshop, Seattle, September 22, 2007.

224. Fundamental symmetries, atomic clocks, and magic wavelengths, Department of Physics and Astronomy colloquium, University of Delaware, September 5, 2007.

225. Polarizabilities, atomic clocks, and magic wavelengths, NIST QIBEC seminar, NIST, Gaithersburg, June 27, 2007.

226. The World of Quantum Information, Physics Department Colloquium, Lafayette College, March 2, 2007.

227. Applications of polarizability calculations: from quantum computation to parity nonconservation, Physics Department AMO seminar, University of Connecticut, January 29, 2007.

228. Recent advances in high-precision atomic calculations and their applications, Physics Department colloquium, Central Michigan University, September 14, 2006.

229. The World of Quantum Information, Special Interest Group in Networking seminar, Department of Computer and Information Sciences, University of Delaware, November 1, 2006.

230. Adventures in Quantum Computing, Signal Processing and Communications seminar, Department of Electrical and Computer Engineering, University of Delaware, October 9, 2006.

231. All-order relativistic atomic structure calculations and their applications, Computations in Quantum Many-Body Physics conference, Santa Fe, NM, June 29, 2006.

232. Adventures in Quantum Computing, University of Nevada-Reno Colloquium, Reno, NV, March 31, 2006.

233. Applications of polarizability calculations: from quantum computation to parity nonconservation, Atomic, Molecular, and Optical Physics seminar, University of California, Berkeley, March 22, 2006.

234. High-performance Computing for Atomic Physics Calculations, UD Computational Science Day 2006, University of Delaware, February 14, 2006.

235. Applications of polarizability calculations: from quantum computation to parity nonconservation, AMO and Quantum Information joint seminar series, University of Maryland, December 6, 2005.

236. Quantum logic gates with neutral atoms, Berkeley's Quantum Information and Quantum Computation Seminar, University of California, Berkeley, 29 March 2005.

237. Parity nonconservation in atoms: the evolving story, Amherst College Physics Department colloquium, 24 February 2005.

238. Parity nonconservation in atoms: current status and remaining mysteries, Physics Department Colloquium, Old Dominion University, 30 November 2004.

239. Parity nonconservation in atoms: current status and remaining mysteries, AMO seminar, Department of Physics and Astronomy, University of Delaware, 6 December 2004.