

# Jason Evan Stalnaker

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CURRENT POSITION	Professor of Physics Chair of Physics & Astronomy Department Department of Physics & Astronomy Oberlin College 110 N Professor St. Oberlin, OH 44074	<i>Phone:</i> (440)775-8336 <i>E-mail:</i> jason.stalnaker@oberlin.edu
RESEARCH INTERESTS	High-precision atomic spectroscopy, Precision tests of fundamental physics using atomic systems, Atomic magnetometry, Femotosecond frequency combs, Optical frequency standards.	
EDUCATION	<b>University of California at Berkeley</b> , Berkeley, California <ul style="list-style-type: none"><li>• Ph.D., Physics, May 2005 Dissertation Title: “Progress Towards Parity Nonconservation in Atomic Ytterbium” Advisors: Dmitry Budker and Stuart J. Freedman</li><li>• M.A., Physics, December 2000</li><li>• B.A., Physics with Highest Honors, May 1998 Minor in Mathematics</li></ul>	
HONORS AND AWARDS	<b>Oberlin College</b> Awarded Research Status, 2020/21 Academic Year <b>Oberlin College</b> Faculty Excellence in Community Engagement Award, 2017 <b>Oberlin College</b> W.M. Keck Foundation Fellowship in the Natural Sciences, 2010 <b>Oberlin College</b> Professor Props Faculty Recognition Nominee, 2008 & 2017 <b>University of California at Berkeley</b> Outstanding Graduate Student Instructor Award, 2002 <b>University of California at Berkeley</b> Helmholtz Scholar, 1999	
ACADEMIC EXPERIENCE	<b>University of California at Berkeley</b> , Berkeley, California Department of Physics <i>Undergraduate Research</i> <b>September 1996 - May 1998</b> Performed high-precision laser spectroscopy of ytterbium atoms in support of atomic parity nonconservation experiment. <b>University of California at Berkeley</b> , Berkeley, California <i>Graduate Research</i> <b>June 1998 - May 2005</b>	

Conducted spectroscopic measurements of ytterbium atoms with the goal of detecting parity nonconservation. Investigated spin relaxation of alkali atoms in paraffin-coated vapor cells in order to evaluate feasibility of developing improved small-scale atomic magnetometers and clocks.

*Student Teaching* **August - December 1998; January - August 2002**  
Graduate-student instructor for introductory physics course geared towards life-science majors. Led discussions, laboratory sections and held course-wide office hours. Received Outstanding Graduate Student Instructor award in May of 2002.

PROFESSIONAL  
EXPERIENCE

**University of California at Berkeley**, Berkeley, California  
Department of Physics

*Postdoctoral Researcher* **May 2005 - August 2005**  
Continued graduate work on the experimental investigation of atomic parity nonconservation in ytterbium and worked on studying vapor-cell atomic magnetometers and clocks in Professor Dmitry Budker's group.

**National Institute of Standards and Technology**, Boulder, Colorado

*National Research Council Postdoctoral Fellow* **October 2005 - July 2007**  
Worked in the Leo Hollberg's Optical Frequency Measurements Group within the Time and Frequency Division. Developed and expanded spectroscopic techniques using femtosecond frequency combs. Researched and performed optical frequency synthesis for optical-optical and optical-microwave frequency comparisons. Worked on the ongoing development of an optical frequency standard based on atomic ytterbium confined within an optical lattice. Supervisors were Scott Diddams and Chris Oates.

**Oberlin College**, Oberlin, Ohio  
Department of Physics & Astronomy

*Professor* **July 2020-Present**

*Chair of Physics & Astronomy Department* **July 2021-Present**  
**July 2018-June 2020**

*Associate Professor* **July 2013-June 2020**

*Assistant Professor* **July 2007-June 2013**

**Courses Taught**

- Physics 058: *The Charm and Strangeness of Particle Physics*
- Physics 104: *Elementary Physics II Laboratory*
- Physics 110: *Mechanics and Relativity Workshop and Laboratory*
- Physics 111: *Electricity, Magnetism, and Thermodynamics*
- Physics 242: *Electronics*
- Physics 310: *Classical Mechanics*

- Physics 311: *Electricity and Magnetism*
- Physics 312: *Quantum Mechanics*
- Physics 314: *Intermediate Laboratory*
- Physics 316: *Waves and Optics*
- Physics 410: *Statistical Mechanics*
- Physics 411/412: *Electrodynamics/Applied Quantum Mechanics*
- Physics 418: *Laboratory Physics*

### **Research**

High-precision spectroscopy of atomic systems using femtosecond frequency combs.  
Precision atomic magnetometry as applied to fundamental physics tests.

### **Grants and Funding**

- Awarded the National Institute of Standards and Technology Precision Measurements Grant for “Precision Spectroscopy of Cold Lithium Atoms with a Femtosecond Frequency Comb” (\$150,000 October 2008 - September 2011)
- Awarded Grant-in-Aid from Oberlin College for “Direct Frequency-Comb Spectroscopy of Atomic Potassium” (\$1,500 January 2013 - June 2013)
- Awarded a National Science Foundation RUI Grant #1305591 for “Precision Spectroscopy of High-Lying States of Atomic Lithium” (\$140,000 August 2013 - August 2016)
- Awarded a National Science Foundation Collaborative Research RUI Grant #1707803 for “Search for Exotic Transient Spin-dependent Signals from Ultralight Dark Matter Fields” (\$235,028 to Oberlin College May 2017 - May 2020)
- Awarded Research Status from Oberlin College for the 2020 - 2021 academic year
- Awarded a National Science Foundation Collaborative Research RUI Grant #2110370 for “Searches for Ultralight Bosonic Dark Matter with Atomic Magnetometer Networks” (\$276,320 to Oberlin College September 2021 - August 2024)

### **Honors Projects Supervised**

- Sean Bernfeld: “Stabilization of a Femtosecond Laser Frequency Comb” (2009)
- William Striegl: “Two-Photon Transitions in Potassium” (2010)
- Jacob Baron: “Precision Spectroscopy of Atomic Lithium with an Optical Frequency Comb” (2012)
- Sophia Chen: “Two-Photon Direct Frequency Comb Spectroscopy of Rubidium” (2012)
- Michael Rowan: “Doppler-Free Saturated Fluorescence Spectroscopy of Lithium Using a Stabilized Frequency Comb” (2013)
- Donal Sheets: “Precision Spectroscopy of Atomic Lithium” (2015)
- Peter Elgee: “Progress Towards Cooling of an Atomic Beam of Lithium” (2016)
- Hannon Ayer: “Two Photon Direct Frequency Comb Spectroscopy of Atomic Potassium” (2017)
- Sun Yool Park: “Construction of a Single Beam SERF Magnetometer using Potassium Atoms for GNOME” (2019)

- Perrin Claire Segura: “Soliton Star Analysis for the Global Network of Optical Magnetometers for Exotic Physics (GNOME)” (2020)
- Dhruv Tandon: “Excess Power Analysis Method for the Global Network of Optical Magnetometers for Exotic Physics (GNOME)” (2022)

### **Oberlin College Service**

- Co-coordinator of Science Fridays at Oberlin College (Spring/Fall 2008)
- Panel Member for the Oberlin College Creativity & Leadership Project’s Creativity Fund (2008)
- Member of the Oberlin College Science Advisory Committee (Fall 2008-Spring 2010; Spring 2011-Spring 2013, Fall 2014-Spring 2016, Fall 2018-Spring 2020)
- Member of Oberlin College Judicial and Community Review Board (Fall 2011-Spring 2013, Spring 2014-Spring 2018, Fall 2019 - Spring 2020)
- Member of Oberlin College Academic Standing Committee, (Fall 2015-Spring 2020, Fall 2021 - present; Committee Chair (Fall 2016, Fall 2017-Spring 2020, Fall 2021 - present)
- Member of Oberlin College Honor Code Committee (Fall 2016-Spring 2017)
- Member of Oberlin College Committee on Undergraduate Research (Fall 2017-Spring 2019)
- Faculty Mentor for the Science and Technology Research Opportunities for a New Generation (STRONG) Program at Oberlin College (2015, 2016, 2018, 2019)
- Faculty Advisor for Oberlin College 3-D Print Club (Spring 2018 - Spring 2019)
- Inside Reviewer for Oberlin College’s Studio Art Program Review (Fall 2019-Spring 2020)

### **Professional Service**

- At-Large Member of the Executive Committee of the American Physical Society Group on Precision Measurements and Fundamental Constants (April 2013-May 2016)
- Chair of the session on “Atom Interferometry and Precision Measurements” at the Division of Atomic, Molecular and Optical Physics Meeting (2014)
- Served on National Science Foundation Funding Panel (2018, 2019)
- Reviewer for numerous journals including *Physical Review Letters*, *Physical Review A*, *Optics Letters*, and *Nature*.

### **Helmholtz Institute, Mainz, Germany**

*Visiting Scientist*

**June 2017 - July 2017**

Worked with Dmitry Budker’s group on precision atomic physics experiments including atomic parity nonconservation and optical magnetometry.

### **SELECTED PUBLICATIONS**

#### **Peer Reviewed Articles**

S. Afach, B.C. Buchler, D. Budker, C. Dailey, A. Derevianko, V. Dumont, N.L. Figueroa, I. Gerhardt, Z.D. Grujić, H. Guo, C. Hao, P.S. Hamilton, M. Hedges, D.F. Jackson Kimball, D. Kim, S. Khamis, T. Kornack, V. Lebedev, Z.-T. Lu, H. Masia-Roig, M. Monroy, M.

- Padniuk, C.A. Palm, S.Y. Park, K.V. Paul, A. Penaflor, X. Peng, M. Pospelov, R. Preston, S. Pustelny, T. Scholtes, P.C. Segura, Y.K. Semertzidis, D. Sheng, Y.C. Shin, J.A. Smiga, J.E. Stalnaker, I. Sulai, D. Tandon, T. Wang, A. Weis, A. Wickenbrock, T. Wilson, T. Wu, D. Wurm, W. Xiao, Y. Yang, D. Yu, and J. Zhang, “Search for topological defect dark matter using the global network of optical magnetometers for exotic physics (GNOME),” *Nature Physics*, **17**, 1396 (2021).
- H. Masia-Roig, J.A. Smiga, D. Budker, V. Dumont, Z. Grujić, D. Kim, D.F. Jackson Kimball, V. Lebedev, M. Monroy, S. Pustelny, T. Scholtes, P.C. Segura, Y.K. Semertzidis, Y. Chang Shin, J.E. Stalnaker, I. Sulai, A. Weis, A. Wickenbrock, “Analysis method for detecting topological defect dark matter with a global magnetometer network,” *Physics of the Dark Universe*, **28**, 100494 (2020).
- D. Antypas, A. Fabricant, J.E. Stalnaker, K. Tsigtutkin, V.V. Flambaum, and D. Budker, “Isotopic variation of parity violation in atomic ytterbium: Description of the measurement method and analysis of systematic effects,” *Physical Review A*, **100**, 012503 (2019).
- D. Antypas, A. Fabricant, J.E. Stalnaker, K. Tsigtutkin, V.V. Flambaum, and D. Budker, “Isotopic variation of parity violation in atomic ytterbium,” *Nature Physics*, **15**, 120 (2019).
- S. Afach, D. Budker, G. DeCamp, V. Dumont, Z.D. Grujić, H. Guo, D.F. Jackson Kimball, T.W. Kornack, V. Lebedev, W. Li, H. Masia-Roig, S. Nix, M. Padniuk, C.A. Palm, C. Pankow, A. Penaflor, X. Peng, S. Pustelny, T. Scholtes, J.A. Smiga, J.E. Stalnaker, A. Weis, A. Wickenbrock, D. Wurm, “Characterization of the global network of optical magnetometers to search for exotic physics (GNOME),” *Physics of the Dark Universe*, **22**, 162 (2018).
- J.E. Stalnaker, H.M.G. Ayer, J.H. Baron, A. Nuñez, and M.E. Rowan, “Measurement of the  $4 S_{1/2} \rightarrow 6 S_{1/2}$  transition frequency in atomic potassium via direct frequency comb spectroscopy,” *Physical Review A*, **96**, 012504 (2017).
- J.E. Stalnaker, S.L. Chen, M.E. Rowan, K. Nguyen, T. Pradhananga, C.A. Palm, and D.F. Jackson Kimball, “Velocity-selective direct frequency-comb spectroscopy of atomic vapors,” *Physical Review A*, **86**, 033832 (2012).
- J.E. Stalnaker, V. Mbele, V. Gerginov, T.M. Fortier, S.A. Diddams, L. Hollberg, and C.E. Tanner, “Femtosecond frequency comb measurement of absolute frequencies and hyperfine coupling constants in cesium vapor,” *Physical Review A* **81**, 043840 (2010).
- K. Tsigtutkin, D. Dounas-Frazer, A. Family, J.E. Stalnaker, V.V. Yashchuk, and D. Budker, “Parity violation in atomic ytterbium: Experimental sensitivity and systematics,” *Physical Review A* **81**, 032114 (2010).
- K. Tsigtutkin, D. Dounas-Frazer, A. Family, J.E. Stalnaker, V.V. Yashchuk, and D. Budker, “Observation of a Large Atomic Parity Violation Effect in Ytterbium,” *Physical Review Letters* **103**, 071601 (2009).
- N. Poli, Z.W. Barber, N.D. Lemke, C.W. Oates, L.S. Ma, J.E. Stalnaker, T.M. Fortier, S.A. Diddams, L. Hollberg, J.C. Bergquist, A. Brusch, S. Jefferts, T. Heavner, and T. Parker, “Frequency evaluation of the doubly forbidden  $^1S_0 \rightarrow ^3P_0$  transition in bosonic  $^{174}\text{Yb}$ ,” *Physical Review A* **77**, 050501(R) (2008).
- T. Rosenband, D.B. Hume, P.O. Schmidt, C.W. Chou, A. Brusch, L. Lorini, W.H. Oskay,

R.E. Drullinger, T.M. Fortier, J.E. Stalnaker, S.A. Diddams, W.C. Swann, N.R. Newbury, W.M. Itano, D.J. Wineland, and J.C. Bergquist, “Frequency ratio of  $\text{Al}^+$  and  $\text{Hg}^+$  single-ion optical clocks; metrology at the 17th decimal place,” *Science* **319**, 1808 (2008).

A.D. Ludlow, T. Zelevinsky, G.K. Campbell, S. Blatt, M.M. Boyd, M.H.G. de Miranda, M.J. Martin, J.W. Thomsen, S.M. Foreman, J. Ye, T.M. Fortier, J.E. Stalnaker, S.A. Diddams, Y. Le Coq, Z.W. Barber, N. Poli, N.D. Lemke, K.M. Beck, and C.W. Oates, “Sr lattice clock at  $1 \times 10^{-16}$  fractional uncertainty by remote optical evaluation with a Ca clock,” *Science* **319**, 1805 (2008).

Z.W. Barber, J.E. Stalnaker, N.D. Lemke, C.W. Oates, T.M. Fortier, S.A. Diddams, L. Hollberg, and C. W. Hoyt, “Optical Lattice Induced Light Shifts in a Yb Atomic Clock,” *Physical Review Letters* **100**, 103002 (2008).

S.M. Foreman, A.D. Ludlow, M. de Miranda, J.E. Stalnaker, S.A. Diddams, and J. Ye, “Coherent optical carrier transfer over a 32-km fiber with long-term instability  $< 10^{-17}$ ,” *Physical Review Letters* **99**, 153601 (2007).

J.E. Stalnaker, S.A. Diddams, T.M. Fortier, K. Kim, L. Hollberg, J.C. Bergquist, W.M. Itano, M.J. Delany, L. Lorini, W.H. Oskay, T.P. Heavner, S.R. Jefferts, F. Levi, T.E. Parker and J. Shirley, “Optical-to-microwave frequency comparison with a fractional uncertainty of  $10^{-15}$ ,” *Applied Physics B* **89**, 167 (2007).

T. Rosenband, P.O. Schmidt, D.B. Hume, W.M. Itano, T.M. Fortier, J.E. Stalnaker, K. Kim, S.A. Diddams, J.C.J. Koelemeij, J.C. Bergquist and D.J. Wineland, “Observation of the  $^1S_0 \rightarrow ^3P_0$  clock transition in  $^{27}\text{Al}^+$ ,” *Physical Review Letters* **98**, 220801 (2007).

J.E. Stalnaker, Y. Le Coq, T.M. Fortier, S.A. Diddams, C.W. Oates and L. Hollberg, “Measurement of excited-state transitions in cold calcium atoms by direct femtosecond frequency-comb spectroscopy,” *Physical Review A* **75**, 040502(R) (2007).

T.M. Fortier, N. Ashby, J.C. Bergquist, M.J. Delaney, S.A. Diddams, T.P. Heavner, L. Hollberg, W.M. Itano, S.R. Jefferts, K. Kim, F. Levi, L. Lorini, W.H. Oskay, T.E. Parker, J. Shirley and J.E. Stalnaker, “Improved limits on variation of the fine structure constant and violation of local position invariance,” *Physical Review Letters* **98**, 070801 (2007).

J.S. Guzman, A. Wojciechowski, J.E. Stalnaker, K. Tsigutkin, V.V. Yashchuk and D. Budker, “Nonlinear magneto-optical rotation, Zeeman and hyperfine relaxation of potassium atoms in a paraffin-coated cell,” *Physical Review A* **74**, 053415 (2006).

T.M. Fortier, Y. Le Coq, J.E. Stalnaker, D. Ortega, S.A. Diddams, C.W. Oates and L. Hollberg, “Kilohertz-Resolution Spectroscopy of Cold Atoms with an Optical Frequency Comb,” *Physical Review Letters* **97**, 163905 (2006).

M.V. Balabas, D. Budker, J. Kitching, P.D.D. Schwindt and J.E. Stalnaker, “Magnetometry with millimeter-scale antirelaxation-coated alkali-metal vapor cells,” *Journal of the Optical Society of America B* **23**, 1001 (2006).

J.E. Stalnaker, D. Budker, S.J. Freedman, J.S. Guzman, S.M. Rochester and V.V. Yashchuk, “Dynamic Stark effect and forbidden-transition spectral line shapes,” *Phys-*

ical Review A **73**, 43416 (2006).

M. Auzinsh, D. Budker, D.F. Kimball, S.M. Rochester, J.E. Stalnaker, A.O. Sushkov and V.V. Yashchuk, “Can a quantum nondemolition measurement improve the sensitivity of an atomic magnetometer?,” *Physical Review Letters* **93**, 173002 (2004).

D. Budker and J.E. Stalnaker, “Magnetolectric Jones dichroism in atoms,” *Physical Review Letters*, **91**, 263901 (2003).

J.E. Stalnaker, D. Budker, D.P. DeMille, S.J. Freedman and V.V. Yashchuk, “Experimental determination of the  $6s^2\ ^1S_0 \rightarrow 6s5d\ ^3D_1$  magnetic-dipole transition amplitude in atomic ytterbium,” *Physical Review A* **65**, 031403(R) (2002).

D.F. Kimball, D. Clyde, D. Budker, D. DeMille, S.J. Freedman, S. Rochester, J.E. Stalnaker and M. Zolotarev, “Collisional perturbation of states in atomic ytterbium by helium and neon,” *Physical Review A* **60**, 1103 (1999).

C.J. Bowers, D. Budker, D. DeMille, S.J. Freedman, G. Gwinner and J.E. Stalnaker, “Experimental investigation of the  $6s^2\ ^1S_0 \rightarrow 6s5d\ ^3D_{1,2}$  forbidden transitions in atomic ytterbium,” *Physical Review A* **59**, 3513 (1999).

### Book Chapters and Conference Proceedings

N.D. Lemke, A.D. Ludlow, Z.W. Barber, N. Poli, C.W. Hoyt, L.S. Ma, J.E. Stalnaker, C. W. Oates, L. Hollberg, J.C. Bergquist, A. Brusch, T.M. Fortier, S.A. Diddams, T. Heavner, S. Jefferts and T. Parker, “The Yb optical lattice clock,” *Proceedings of the 7th Symposium on Frequency Standards and Metrology 2008*, L. Maleki, Ed., World Scientific, pp. 200-208 (2009).

T. Rosenband, D.B. Hume, C.-W. Chou, J.C.J. Koelemeij, A. Brusch, S. Bickman, W.H. Oskay, T.M. Fortier, J.E. Stalnaker, S.A. Diddams, N.R. Newbury, W.C. Swann, W.M. Itano, D.J. Wineland and J.C. Bergquist, “Alpha-dot or not: Comparison of two single atom optical clocks,” *Proceedings of the 7th Symposium on Frequency Standards and Metrology 2008*, L. Maleki, Ed., World Scientific, pp. 20-31 (2009).

L. Lorini, N. Ashby, A. Brusch, S. Diddams, R. Drullinger, E. Eason, T. Fortier, P. Hastings, T. Heavner, D. Hume, W. Itano, S. Jefferts, N. Newbury, T. Parker, T. Rosenband, J. Stalnaker, W. Swann, D. Wineland and J. Bergquist, “Recent atomic clock comparisons at NIST,” *Eur. Phys. J. Special Topics* **163**, 19 (2008).

M.C. Stowe, M.J. Thorpe, A. Pe’er, J. Ye, J.E. Stalnaker, V. Gerginov and S.A. Diddams, “Direct Frequency Comb Spectroscopy” in: *Advances in Atomic, Molecular Physics and Optical Physics 55*, E. Arimondo, P. Berman, C. Lin Eds. Elsevier (2007).

K. Tsigtukin, J.E. Stalnaker, D. Budker, S.J. Freedman and V.V. Yashchuk, “Towards measuring nuclear-spin-dependent and isotopic-chain atomic parity violation in Ytterbium,” in *From Parity Violation to Hadronic Structure and more...*, Ed. by K. de Jager et al, Springer (2007).

J.E. Stalnaker, S.A. Diddams, K. Kim, L. Hollberg, E.A. Donley, T.P. Heavner, S.R. Jefferts,

F. Levi, T.E. Parker, J.C. Bergquist, W.M. Itano, M.J. Jensen, L. Lorini, W.H. Oskay and T.M. Fortier, “Absolute Optical Frequency Measurements with a Fractional Frequency Uncertainty at  $1 \times 10^{-15}$ ,” International Frequency Control Symposium and Exposition IEEE 2006, 462 (2006).

C.W. Oates, C.W. Hoyt, Y. Le Coq, Z.W. Barber, T.M. Fortier, J.E. Stalnaker, S.A. Diddams and L. Hollberg, “Stability Measurements of the Ca and Yb Optical Frequency Standards,” International Frequency Control Symposium and Exposition IEEE 2006, 74 (2006).

D. English, D.F. Kimball, C.-H. Li, A.-T. Nguyen, S.M. Rochester, J.E. Stalnaker, V.V. Yashchuk, D. Budker, S.J. Freedman and M. Zolotarev: “Atomic tests of discrete symmetries at Berkeley,” in: *Art and Symmetry in Experimental Physics: Festschrift for Eugene D. Commins*, D. Budker, S.J. Freedman, and P.H. Bucksbaum, Eds., AIP, pp. 108-122 (2001).

### Book Reviews

J.E. Stalnaker, Review of *Laser Experiments for Chemistry and Physics* by R.N. Compton and M.A. Duncan, *Physics Today* **70**, 60 (2017).

INVITED TALKS **Johannes Gutenberg Univetsität:** QUANTUM Seminar “Direct Frequency-Comb Spectroscopy: Using Ultra-Short Pulses for Precision Spectroscopy,” June 2017.

**Case Western Reserve University:** Particle/Astrophysics Seminar “Redefining Accuracy: Optical Frequency Combs and Precision Spectroscopy,” February 2015.

**New Ideas in Low-Energy Tests of Fundamental Physics Conference:** Invited Conference Talk “Precision Spectroscopy of Lithium,” June 2014.

**John Carroll University:** Physics Seminar “Counting the Cycles of Light: Using Laser Frequency Combs to Look for New Physics,” February 2014.

**New Laser Scientists Conference:** Invited Conference Talk “Direct Frequency-Comb Spectroscopy of Atomic Vapors,” October 2012.

**College of Wooster:** Physics Colloquium “Counting the Cycles of Light: Using Frequency Combs to Study Atoms,” January 2010.

**Kenyon College:** Physics Colloquium “Counting the Cycles of Light: Using Frequency Combs to Study Atoms,” January 2010.

**Cal-State East Bay University:** Physics Seminar “Counting the Cycles of Light: Using Frequency Combs to Learn New Physics,” October 2009.

**University of California at Berkeley:** Atomic, Molecular, and Optical Physics Seminar “Redefining Accuracy: How frequency combs have changed spectroscopy,” October 2009.

**Air Force Institute of Technology at Wright-Patterson Air Force Base:** Department of Engineering Physics Seminar “Counting the Frequency of Light: Using Optical Frequency Combs to Study Atoms,” April 2009.

**National Metrology Institute of Japan and Bureau International des Poids et Mesures Joint Workshop on Frequency Combs:** Invited Symposium Talk “Direct



Frequency Comb Spectroscopy: Optical Frequency Measurements with Ultra-short Pulses,” May 2007.

**Conference on Lasers and Electro-Optics (CLEO):** Invited Conference Talk “High Resolution Spectroscopy with Femtosecond Optical Combs,” May 2007.

**Pomona College:** Department of Physics Colloquium “Atomic Clocks, Frequency Combs and the Search for Varying “Constants”,” February 2007.

**Oberlin College:** Department of Physics and Astronomy Seminar “Atomic Clocks, Frequency Combs and the Search for Varying “Constants”,” February 2007.

**Vassar College:** Department of Physics and Astronomy Seminar “Atomic Clocks, Frequency Combs and the Search for Varying “Constants”,” February 2007.

**Reed College:** Physics Department Seminar “Atomic Clocks, Frequency Combs and the Search for Varying “Constants”,” January 2007.

**Lawrence University:** Physics Colloquium “Atomic Clocks, Frequency Combs and the Search for Varying “Constants”,” January 2007.

**Jefferson Laboratory:** Physics Seminar “Atomic Parity Nonconservation in Atomic Ytterbium,” September 2002.

**Stanford Linear Accelerator:** Experimental Seminar “Atomic Parity Nonconservation Experiments at the University of California at Berkeley,” October 2001.

**University of California at Berkeley:** Atomic Physics Seminar “Impact of Atomic Parity Nonconservation on Nuclear and Particle Physics,” August 2000.

**European Centre for Theoretical Studies in Nuclear Physics and Related Areas, Trento, Italy:** Workshop on Parity Violation in Atomic, Nuclear, and Hadronic Systems “Parity Nonconservation Experiments at the University of California at Berkeley,” June 2000.

**National Institute for Nuclear Theory, University of Washington** Workshop on Violations of Fundamental Symmetries in Atoms and Nuclei: “Measurement of the  $6s^2\ ^1S_0 \rightarrow 6s5d\ ^3D_1$  M1 Transition in Ytterbium,” July 1999.