

# Claire E. Cramer

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## Education

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| 2007 | Ph.D., Physics<br>Thesis: <i>A Torsion Balance Search for Spin-Coupled Interactions</i><br>University of Washington, Seattle                                   |
| 2002 | M.S., Physics<br>University of Washington, Seattle   |
| 1998 | B.S., Physics<br>Honors thesis: <i>Nucleation of Bubbles in Liquid <math>^3\text{He}</math></i><br>Brown University, magna cum laude                           |
| 1998 | B.A., Aesthetic Representation in Music and Literature<br>Honors Thesis: <i>The Ninth Symphony: A Search for Language</i><br>Brown University, magna cum laude |

## Fellowships, Awards and Honors

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| 2003-2006 | National Science Foundation Graduate Research Fellowship |
| 2003      | Sebastien Karrer Prize in Physics                        |
| 1998      | Phi Beta Kappa, Sigma Chi                                |

## Research Experience

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| 2007 – Present | Postdoctoral Fellow<br>Harvard University, Department of Physics<br>Advisors: Christopher Stubbs, Ronald Walsworth<br>◊ Developed laser calibration sources for precision measurements in astronomical spectroscopy and spectrophotometry, collaborated with CfA astronomers to apply calibrations to stellar age determinations, supernova redshift surveys, searches for extrasolar planets, and characterization of dark matter within globular clusters. |
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- 2005 – 2007 Graduate Research Assistant  
University of Washington, Department of Physics  
Advisors: Eric Adelberger, Blayne Heckel  
◊ Using a torsion balance with a net spin but no net magnetic moment, set stringent limits on Lorentz and CP-violating interactions predicted to couple to electron spin.
- 2002 – 2005 Graduate Research Assistant  
University of Washington, Department of Physics  
Advisor: E. Norval Fortson  
◊ Participated in initial measurements of a clock transition in cold, trapped, neutral Yb atoms.
- 1994 – 1998 Undergraduate Research Assistant  
Brown University, Department of Physics  
Advisors: Humphrey Maris, George Seidel

## Professional Development

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- 2008 Trained to perform astronomical observations using instruments at the MMT and Fred Lawrence Whipple Observatory  
Mt. Hopkins, Arizona
- 2006 Accelerator Operator Training  
Center for Experimental Nuclear Physics and Astrophysics  
University of Washington, Seattle
- 2005 SLAC Summer Institute: Gravity in the Quantum World and the Cosmos  
Stanford University
- 2003 Laser Operator Training Course, Coherent, Inc.

## Service, Teaching and Outreach

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- 2008 – Present Content Coordinator for “*Physics in the 21st Century*,” a multimedia course in modern physics sponsored by the Annenberg foundation and produced by the Science Media Group at the Harvard-Smithsonian Center for Astrophysics
- 2009 Organizer, Professional Development Workshops for Postdoctoral Fellows  
Harvard University, Department of Physics
- 2003-2005 Student Representative, Physics Graduate Committee, University of Washington
- 2002-2003 Physics Graduate Student Council Spokesperson, University of Washington

2001 – 2002	Teaching Assistant, University of Washington, Department of Physics
2001	Calculus Teacher, Rhode Island College Upward Bound Program
1998 – 2000	English Language Teacher, U.S. Peace Corps Merkelio Rackausko Ginnazija, Mazeikiai, Lithuania
2000	Director, Women’s Business Leadership Camp, Anyksciai, Lithuania
1999	Assistant Director, Women’s Business Leadership Camp, Anyksciai, Lithuania

### Invited Presentations

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June, 2009	<i>“Unprecedented Precision: Calibrating Astronomical Spectra with Lasers,”</i> NOAO, Tucson
November, 2008	<i>“Precision Astronomy: Why Physicists Should Care and How Physicists Can Help,”</i> Physics Department Colloquium, Colby College
October, 2007	<i>“Spin-Dependent Interactions and Fundamental Physics,”</i> Astrophysics Seminar, Fermilab
October, 2005	<i>“Torsion Balance Tests of Sub-Gravitational Forces,”</i> Phenomenology Seminar, Harvard University
September, 2003	<i>“Prospects for an Optical Clock Using the <math>^1S_0 - ^3P_0</math> Line in Atomic Yb,”</i> Second Workshop on Cold Alkaline Earth Atoms, Copenhagen, Denmark

### Refereed Publications

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*“Improving the Calibration of High Dispersion, Multi-Object, Optical Spectrographs Using Tunable Lasers”* **C.E. Cramer**, K. R. Lykke, S. W. Brown, A. Szentgyorgyi, A. K. Dupree, A. Smith; *in preparation*

*“Limits on Spin-Spin Couplings between Neutrons”* A.G. Glenday, **C.E. Cramer**, D.F. Phillips, R.L. Walsworth; Physical Review Letters, 101, 26, 23 Dec. 2008, 261801

*“Preferred-frame and CP-violation tests with polarized electrons”* B.R. Heckel, E.G. Adelberger, **C.E. Cramer**, T.S. Cook, S. Schlamminger, U. Schmidt; Physical Review D, 78, 9, 13 Nov. 2008, 092006

*“New CP-violation and preferred frame tests with polarized electrons”*  
B.R. Heckel, **C.E. Cramer**, T.S. Cook, E.G. Adelberger, S. Schlamminger, U. Schmidt; Physical Review Letters, 97, 2, 14 July 2006, 021603

*“Observation of the  $^1S_0 - ^3P_0$  transition in atomic ytterbium for optical clocks and qubit arrays”*  
T. Hong, **C.E. Cramer**, W. Nagourney, E.N. Fortson; Optics Letters, 30, 19, 1 Oct. 2005, p. 2644-6

*“Optical clocks based on ultranarrow three-photon resonances in alkaline-earth atoms”* T. Hong, **C.E. Cramer**, W. Nagourney, E.N. Fortson; Physical Review Letters, 94, 5, 11 Feb. 2005, 050801

*“Electrons and cavitation in liquid helium-3”* C.-K. Su, **C.E. Cramer**, H.J. Maris; Journal of Low Temperature Physics, 113, 2-4, 22 May 1998, p.293-8

### Conference Proceedings in the Past 3 Years

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*“A Tunable Laser System for the Wavelength Calibration of Astronomical Spectrographs”*  
**C.E. Cramer**, S.W. Brown, N. Caldwell, A.K. Dupree, S.G. Korzennik, K.R. Lykke, A. Szentgyorgyi; in CLEO/IQE, OSA Technical Digest, JThE85 (2009)

*“Astro-comb: revolutionizing precision spectroscopy in astrophysics”*  
**C.E. Cramer**, C.-h. Li, A.J. Benedick, A.G. Glenday, F.X. Kaertner, D.F. Phillips, D. Sasselov, A. Szentgyorgyi, R.L. Walsworth; in Transiting Planets, Proceedings of the IAU, 253, p. 499-501 (2009)

*“Deploying comb and tunable lasers to enable precision radial velocity surveys”*  
A. Szentgyorgyi, **C.E. Cramer**, A.J. Benedick, A.G. Glenday, F.X. Kaertner, S.G. Korzennik, C.-h. Li, M.P. Ordway, D.F. Phillips, D. Sasselov, R.L. Walsworth; in Ground-based and Airborne Instrumentation for Astronomy II, Proceedings of the SPIE, 7014, p. 70141W-70141W-9 (2008)