

Peter Wickelgren Graham

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Positions Held

09/2010 - **Stanford Institute for Theoretical Physics** Assistant Professor of Physics
10/2008 - 08/2010 **Stanford Institute for Theoretical Physics** Postdoctoral Scholar
09/2008 - 10/2008 **Institute for Advanced Study** Visiting Member
07/2007 - 09/2008 **SLAC** Research Associate

Education

Ph.D. 2007, Physics, **Stanford University**
A.M. 2002, Physics, **Harvard University**
A.B. 2002, Physics, **Harvard University**, *magna cum laude* with Highest Honors in Physics

Major Invited Talks

2013 Caltech Physics Colloquium: “Axion Detection with NMR”
2013 Arizona State University Physics Colloquium: “Axion Detection with NMR”
2013 Enrico Fermi Atom Interferometry School: “Gravitational Wave Detection”
2013 The Future of Physics Beyond the Standard Model Workshop, U. Sheffield: “Axion Detection with NMR”
2013 U. Maryland Particle Theory Seminar: “Axion Detection with NMR”
2013 Identify and Characterizing Dark Matter Conference, KITP: “Axion Detection with NMR”
2013 Brookhaven Forum 2013: “Axion Detection with NMR”
2013 Institute for Nuclear and Particle Astrophysics and Cosmology Conference (INPAC-MRPI), Asilomar: “Axion Detection with NMR”
2013 SLAC ATLAS Physics Analysis Jamboree: “Regions of Interest in RPV”
2013 U. Victoria Particle Theory Seminar: “Axion Detection with NMR”
2013 SnowDark Conference: “Axion Detection with NMR”
2013 University of Washington Physics Colloquium: “Axion Detection with NMR”
2013 Cosmic Frontier Meeting, SLAC, “New Directions for Direct Detection of Dark Matter”
2012 Frontiers Beyond the Standard Model III: “A New Operator for Axion Dark Matter Detection”
2012 Patras workshop on Axions, WIMPs, and WISPs: “A New Operator for Axion Dark Matter Detection”
2012 Harvard Physics Dept. Seminar: “Axion Dark Matter Detection with Cold Molecules”
2011 NYU Physics Dept. Seminar: “A Simple Harmonic Universe”

- 2011 National Academy of Sciences, Board of Physics and Astronomy (BPA): “Fundamental Physics with Atomic Interferometry”
- 2011 UC Santa Cruz Physics Colloquium: “Fundamental Physics with Atomic Interferometry”
- 2010 National Academy of Sciences, Committee on Atomic, Molecular, and Optical Sciences (CAMOS): “Fundamental Physics with Atomic Interferometry”
- 2010 UC Davis Physics Colloquium: “Fundamental Physics with Atomic Interferometry”
- 2009 Ohio State University Physics Colloquium: “Astrophysical Probes of Unification”.
- 2009 UC Santa Barbara Physics Colloquium: “Astrophysical Probes of Unification”.
- 2009 Stanford Physics/Applied Physics Colloquium: “Astrophysical Probes of Unification”.
- 2007 CERN Theory Colloquium: “Physics with Cold Atoms” at *New Physics and the LHC* institute.
- 2007 Invited speaker: “Testing Gravity with Atom Interferometry” at *Fundamental Neutron Physics Workshop*, Institute for Nuclear Theory, U. Washington
- 2007 *Rethinking Gravity*, Tucson, AZ: “Testing Gravity with Atom Interferometry”
- 2006 Joint Theory Colloquium at SLAC: “Testing Gravity with Atom Interferometry”
- 2006 Research Progress Meeting talk at LBL “Testing General Relativity with Atom Interferometry”

Teaching

- Physics 262, *Introduction to Gravitation*, Stanford, 2012-2013
- Physics 63, *Electricity, Magnetism, and Waves*, Stanford, 2011-2013
- Physics 452, *Physics Beyond the Standard Model*, Stanford, 2012
- Physics 290, *Research Activities at Stanford*, Stanford, 2010

Committee Work from 2012-13

- **Chair of the Physics Dept. Graduate Qualifying Exam Committee.**
- **Physics Dept. Graduate Studies Committee.**
- **First-Year Graduate Advising**

Research Proposals from 2012-13

- NSF proposal, PI: Peter W. Graham, “Searching for Physics Beyond the Standard Model,” Dec 2012. Funded
- Hellman Faculty Scholars proposal, PI: Peter W. Graham, “Axion Dark Matter Detection with Nuclear Magnetic Resonance (NMR)”, 2013. Funded
- Sloan Research Fellowship, Sept. 2012. Declined.

Service and Outreach

- Significant involvement with physics education at Bullis Charter School, a local elementary school.**
- Member of Fermi Telescope Collaboration.**
- Co-organizer of SavasFest conference, May 2012.
- Helped redesign Stanford graduate physics curriculum and course offerings, 2012.
- Lectured at EPGY summer institute “Frontiers of Physics” for high school students, 2011-2012.

Honors and Fellowships

Terman Fellowship 2013

Hellman Faculty Scholar 2013

Mellam Family Graduate Fellowship 2006-2007

Achievement Rewards for College Scientists (ARCS) Fellowship 2005-2006

National Defense Science and Engineering Graduate Fellowship, 2002-2005

Sanderson Award for top senior physics student, Harvard University, 2002

Phi Beta Kappa from Harvard University, 2002

Publications

[1] Dmitry Budker, Peter W. Graham, Micah Ledbetter, Surjeet Rajendran, and Alex Sushkov, “Cosmic Axion Spin Precession Experiment (CASPER),” arXiv:1306.6089 [hep-ph]. Submitted to *Phys. Rev. Lett.*

[2] Peter W. Graham and Surjeet Rajendran, “New Observables for Direct Detection of Axion Dark Matter,” *Physical Review D* **88**, 035023 (2013), [arXiv:1306.6088 [hep-ph]].

[3] Peter W. Graham, Jason M. Hogan, Mark A. Kasevich, and Surjeet Rajendran, “A New Method for Gravitational Wave Detection with Atomic Sensors,” *Physical Review Letters* **110**, 171102 (2013), [arXiv:1206.0818 [quant-ph]].

[4] Peter W. Graham, David E. Kaplan, Surjeet Rajendran and Matthew T. Walters, “Semiconductor Probes of Light Dark Matter,” *Physics of the Dark Universe* **1**, 32 (2012), [arXiv:1203.2531 [hep-ph]].

[5] J.L. Hewett et. al., “Fundamental Physics at the Intensity Frontier,” arXiv:1205.2671.

[6] Peter W. Graham, David E. Kaplan, Surjeet Rajendran and Prashant Saraswat, “Displaced Supersymmetry,” *JHEP* **1207**, 149 (2012), [arXiv:1204.6038 [hep-ph]].

[7] M. Ajello et al. [Fermi-LAT Collaboration], “Limits on Large Extra Dimensions Based on Observations of Neutron Stars with the Fermi-LAT,” *JCAP* **1202**, 012 (2012) [arXiv:1201.2460 [astro-ph.HE]].

[8] Peter W. Graham, Kiel Howe, Surjeet Rajendran and Daniel Stolarski, “New Measurements with Stopped Particles at the LHC,” *Phys. Rev. D* **86**, 034020 (2012), [arXiv:1111.4176 [hep-ph]].

[9] Peter W. Graham, Bart Horn, Shamit Kachru, Surjeet Rajendran and Gonzalo Torroba, “A Simple Harmonic Universe,” arXiv:1109.0282 [hep-th].

- [10] Savas Dimopoulos, Peter W. Graham, Jason M. Hogan, Mark A. Kasevich and Surjeet Rajendran, “Reply to ‘Comment on ‘Atomic gravitational wave interferometric sensor’ ’,” *Phys. Rev. D* **84**, 028102 (2011).
- [11] T. A. Porter, R. P. Johnson and P. W. Graham, “Dark Matter Searches with Astroparticle Data,” *Ann. Rev. Astron. Astrophys.* **49**, 155 (2011) [arXiv:1104.2836 [astro-ph.HE]].
- [12] Peter W. Graham and Surjeet Rajendran, “Axion Dark Matter Detection with Cold Molecules,” *Phys. Rev. D* **84**, 055013 (2011) [arXiv:1101.2691 [hep-ph]].
- [13] J. M. Hogan, D. M. S. Johnson, S. Dickerson, T. Kovachy, A. Sugarbaker, S. -w. Chiow, P. W. Graham and M. A. Kasevich et al., “An Atomic Gravitational Wave Interferometric Sensor in Low Earth Orbit (AGIS-LEO),” *Gen. Rel. Grav.* **43**, 1953 (2011) [arXiv:1009.2702 [physics.atom-ph]].
- [14] Brian Feldstein, Peter W. Graham, Surjeet Rajendran. “Luminous Dark Matter” *Physical Review D* **82** 075019 (2010) [arXiv:1008.1988].
- [15] Peter W. Graham, Roni Harnik, Surjeet Rajendran, Prashant Saraswat. “Exothermic Dark Matter” *Physical Review D* **82** 063512 (2010) [arXiv:1004.0937].
- [16] Peter W. Graham, Roni Harnik, Surjeet Rajendran. “Observing the Dimensionality of Our Parent Vacuum” *Physical Review D* **82** 063524 (2010) [arXiv:1003.0236].
- [17] Peter W. Graham, Ahmed Ismail, Surjeet Rajendran, Prashant Saraswat. “A Little Solution to the Little Hierarchy Problem: A Vector-like Generation” *Physical Review D* **81** 055016 (2010) [arXiv:0910.3020].
- [18] Peter W. Graham and Surjeet Rajendran. “A Domino Theory of Flavor” *Physical Review D* **81** 033002 (2010) [arXiv:0906.4657].
- [19] Asimina Arvanitaki, Savas Dimopoulos, Sergei Dubovsky, Peter W. Graham, Roni Harnik, Surjeet Rajendran. “Decaying Dark Matter as a Probe of Unification and TeV Spectroscopy” *Physical Review D* **80** 055011 (2009) [arXiv:0904.2789].
- [20] Asimina Arvanitaki, Savas Dimopoulos, Sergei Dubovsky, Peter W. Graham, Roni Harnik, Surjeet Rajendran. “Astrophysical Probes of Unification” *Physical Review D* **79** 105022 (2009) [arXiv:0812.2075].
- [21] Savas Dimopoulos, Peter W. Graham, Jason M. Hogan, Mark A. Kasevich, Surjeet Rajendran. “An Atomic Gravitational Wave Interferometric Sensor (AGIS)” *Physical Review D* **78** 122002 (2008) [arXiv:0806.2125].
- [22] Savas Dimopoulos, Peter W. Graham, Jason M. Hogan, Mark A. Kasevich. “General Relativistic Effects in Atom Interferometry” *Physical Review D* **78** 042003 (2008) [arXiv:0802.4098].

- [23] Savas Dimopoulos, Peter W. Graham, Jason M. Hogan, Mark A. Kasevich, Surjeet Rajendran. “Gravitational Wave Detection with Atom Interferometry” *Physics Letters B* **678**, 37 (2009) [arXiv: 0712.1250].
- [24] Savas Dimopoulos, Peter W. Graham, Jason M. Hogan, Mark A. Kasevich. “Testing General Relativity with Atom Interferometry” *Physical Review Letters* **98** 111102 (2007) [gr-qc/0610047].
- [25] Peter W. Graham, Aaron Pierce, Jay G. Wacker. “Four Taus at the Tevatron” [hep-ph/0605162].
- [26] Asimina Arvanitaki, Chad Davis, Peter W. Graham, Aaron Pierce, Jay G. Wacker. “Limits on Split Supersymmetry from Gluino Cosmology” *Physical Review D* **72** 075011 (2005) [hep-ph/0504210].
- [27] Asimina Arvanitaki and Peter W. Graham. “Indirect Signals from Dark Matter in Split Supersymmetry” *Physical Review D* **72** 055010 (2005) [hep-ph/0411376].
- [28] Asimina Arvanitaki, Chad Davis, Peter W. Graham, Jay G. Wacker. “One Loop Predictions of the Finely Tuned SSM” *Physical Review D* **70** 117703 (2004) [hep-ph/0406034].
- [29] J. Hong, W.W. Craig, P. Graham, C.J. Hailey, N.J.C. Spooner, D.R. Tovey. “The Scintillation Efficiency of Carbon and Hydrogen Recoils in an Organic Liquid Scintillator for Dark Matter Searches” *Astroparticle Physics* **16** 333-338 (2002).