

Annika Hazel Gottliebe Peter - Curriculum Vitae

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Contact Information

Department of Physics & Astronomy
4129 Frederick Reines Hall
University of California, Irvine
Irvine, CA 92697-4575
+1 (609) 306-9749
annika.peter@uci.edu
<http://www.astro.caltech.edu/~apeter>

Personal Information

Born December 14, 1982 in Seattle, WA, USA. US and German citizen.

Research Interests

Dark-matter detection. The local dark-matter phase-space density. Astrophysical constraints on dark matter. Galaxy and dark-matter halo evolution in different cosmologies. The Local Group dwarf spheroidal galaxies. Solar-system dynamics. Galactic dynamics. Cosmic-ray astrophysics. Computational astrophysics.

Education

- Princeton University, Princeton, NJ
Ph.D. in Physics, June 2008 (defense: March 2008)
Thesis title: *Particle Dark Matter in the Solar System*
Advisor: Scott Tremaine
- University of Washington, Seattle, WA
B.S. Physics, B.S. Astronomy, *magna cum laude*, June 2002
Minors: Geophysics, Mathematics

Honors and Awards

- 2011 - 2013: McCue Fellowship, University of California, Irvine.
- 2002 - 2003: Princeton University First-Year Fellowship.
- 2002 - 2003: Joseph Henry Prize, Princeton University.
- 2001 - 2002: Barry M. Goldwater Scholarship.
- 2001: Phi Beta Kappa.
- 2001: NSF Research Experiences for Undergraduates stipend to the Smithsonian Astrophysical Observatory.
- 2000-2001: Gregory Lynn Andersen Scholarship (University of Washington Department of Physics scholarship recognizing academic excellence).
- 2000: NSF Research Experiences for Undergraduates stipend to University of California, San Diego.
- 2000: VWR Scientific Instruments Scholarship (University of Washington).
- 1999: Paradise Endowment Scholarship (University of Washington).

Research Appointments

- 01/2011 - 12/2013: McCue Fellow, University of California, Irvine.
- 01/2008 - 12/2010: Postdoctoral Scholar in Physics, Caltech.
- 09/2002 - 03/2008: Graduate Student Researcher, Princeton University.
 - WIMP capture and dynamics in the Solar System (thesis project), supervised by Scott

- Tremaine.
 - Rest-frame UV morphologies of star-forming galaxies in and near a protocluster at $z=2.300$, supervised by Alice Shapley.
 - Black hole accretion of dark matter, supervised by Paul Steinhardt.
 - Microwave lens design for the CAPMAP experiment, supervised by Suzanne Staggs.
- 06/2001 - 08/2001: Undergraduate Student Researcher, Smithsonian Astrophysical Observatory, supervised by Andreas Zezas and Giuseppina Fabbiano.
- 06/2000 - 08/2000: Undergraduate Student Researcher, University of California, San Diego, supervised by George M. Fuller.
- 01/1999 - 06/2001: Undergraduate Student Researcher, University of Washington, supervised by Tom Steiger and Steve Elliot.

Collaborations

- 2010-present: member, Observatory for Multi-Epoch Gravitational-lens Astrophysics (OMEGA) Explorer science team.

Service and Outreach

- Scientific:
 - 06/2009 – 01/2011: Co-founder and organizer, Caltech Dark Matter Discussion Group.
 - 03/2009 - present: Referee for Journal of Cosmology and Astroparticle Physics, Monthly Notices of the Royal Astronomical Society, Physical Review D, Physical Review Letters.
 - 10/2004 - 06/2006: Project ASTRO, working with third-graders at Triangle Elementary School, Hillsborough, NJ.
- Departmental/University-Wide:
 - 04/2011 – present: Founder, “Women in Astrophysics” meet-ups at UC Irvine.
 - 10/2009 – 01/2011: Co-founder, “Women in Cahill” monthly potlucks for women astronomers and astrophysicists in the Pasadena area.
 - 03/2005 - 03/2006: Recording Secretary, Graduate Student Government, Princeton University.
 - 09/2004 - 09/2005: Member, Council of the Princeton University Community General Assembly.
 - 10/2003 - 08/2007: Member, Princeton Physics Department Graduate Student Committee.
 - 10/2003 - 10/2006: Physics Department Representative to the Graduate Student Government, Princeton University.

Memberships

- 2001 - 2003; 2006 - 2011: Junior, associate member, American Astronomical Society.

Teaching Experience

- 09/2005 - 01/2006: Assistant in Instruction for Ast 105: Our Place in the Universe, Princeton University.
- 02/2005 - 05/2005: Assistant in Instruction for Phy 102: Introductory Physics II, Princeton University.
- 09/2004 - 01/2005: Assistant in Instruction for Phy 103: General Physics I, Princeton University.
- 09/2003 - 05/2004: Assistant in Instruction for Phy 111: Contemporary Physics, Princeton University.
- 09/2000 - 06/2001: Teaching Assistant for modern European and American history, University of Washington Transition School.

Student Collaborators

- Caltech:
 - Laura Book (graduate): 2009-2010
 - Vera Gluscevic (graduate): 2010-present
 - Samuel Lee (graduate): 2011-present
 - Christopher Moody (undergraduate; now a grad student at UC Santa Cruz): 2008-2010
- Imperial College London
 - Charlotte Strege (graduate): 2011-present
- University of British Columbia
 - Jonathan Loranger (MSc): 2011-present
- University of California, Irvine
 - Bryan Arant (undergraduate): 2010-present
 - Shea Garrison-Kimmel (graduate): 2011-present
 - Gregory Martinez (graduate; now a postdoc at UC Irvine): 2011-present
 - Miguel Rocha (graduate): 2010-present
- University of Zürich
 - Tobias Bruch (graduate; now a postdoc at University of Zürich): 2008-2009

Publications

- Submitted:
 - M. Rocha, **A. H. G. Peter**, and J. Bullock, "Infall Times of Milky Way Satellite Galaxies from Their Present-Day Kinematics", to MNRAS on 10/1/2011, arXiv:1110.0464
- Refereed Publications:
 - **A. H. G. Peter**, "WIMP astronomy and particle physics with liquid-noble and cryogenic direct-detection experiments", Phys. Rev. D 83, 125029 (2011), arXiv:1103.5145.
 - L. G. Book, A. Brooks, **A. H. G. Peter**, A. J. Benson, and F. Governato, "Angular Momentum Evolution in Dark Matter Halos", MNRAS 411, 1963 (2011), arXiv:1006.4365.
 - **A. H. G. Peter** and A. J. Benson, "Dark-matter decays and Milky Way satellite galaxies", Phys. Rev. D 82, 123521 (2010), arXiv:1009.1912.
 - **A. H. G. Peter**, C. E. Moody, and M. Kamionkowski, "Constraints on decaying dark matter models from simulations of isolated halos", Phys. Rev. D 81, 103501 (2010).
 - **A. H. G. Peter**, "Mapping the allowed parameter space for decaying dark matter models", Phys. Rev. D 81, 083511 (2010).
 - **A. H. G. Peter**, "Getting the astrophysics and particle physics of dark matter out of next-generation direct detection experiments", Phys. Rev. D 81, 087301 (2010).
 - **A. H. G. Peter**, "Dark matter in the Solar System III: The distribution function of WIMPs at the Earth from gravitational capture", Phys. Rev. D 79, 103533 (2009).
 - **A. H. G. Peter**, "Dark matter in the Solar System II: WIMP annihilation rates in the Sun", Phys. Rev. D 79, 103532 (2009).
 - **A. H. G. Peter**, "Dark matter in the Solar System I: The distribution function of WIMPs at the Earth from solar capture", Phys. Rev. D 79, 103531 (2009).
 - T. Bruch, **A. H. G. Peter**, J. Read, L. Baudis, and G. Lake, "Dark matter disc enhanced neutrino fluxes from the Sun and Earth", Phys. Lett. B 674, 250 (2009).
 - **A. H. G. Peter**, A. E. Shapley, D. R. Law, C. C. Steidel, D. K. Erb, N. A. Reddy, and M. Pettini, "Morphologies of Galaxies in and around a Protocluster at $z=2.300$ ", ApJ 668, 23 (2007).
 - A. Zezas, M. Birkinshaw, D. M. Worrall, **A. Peters**, and G. Fabbiano, "Chandra Observations of NGC 4261 (3C 270): Revealing the Jet and Hidden Active Galactic Nucleus in a Type 2 LINER", ApJ 627, 711 (2005).

- Conference Proceedings:
 - **A. H. G. Peter**, C. E. Moody, A. J. Benson, M. Kamionkowski, “Constraints on Decaying Dark Matter”, contribution to the Identification of Dark Matter Meeting, July 26-30, 2010, arXiv:1011.4970.
 - J. I Read, T. Bruch, L. Baudis, V. Debattista, O. Agertz, L. Mayer, A. M. Brooks, F. Governato, **A. H. G. Peter**, and G. Lake, “A Dark Matter Disc in the Milky Way”, in HUNTING FOR THE DARK: THE HIDDEN SIDE OF GALAXY FORMATION, ed. V. P. Debattista and C. C. Popescu, AIP Conference Series 1240, 391 (2010).
 - **A. H. G. Peter**, "Dark matter bound to the Solar System: consequences for annihilation searches", in *2009 Electroweak Interactions and Unified Theories*, ed. Etienne Agué, Jacques Dumarchez, Jean-Marie Frère, Lydia Iconomidou and Jean Traân Thanh Vân, proceedings of the XLIVth Rencontres de Moriond (Thê' Giói Publishers, Vietnam, 2009), pp. 359-366.
 - **A. H. G. Peter** and S. Tremaine, "Dynamics of WIMPs in the solar system and implications for direct and indirect detection", in Proceedings of "Identification of dark matter 2008". August 18-22, 2008, Stockholm, Sweden, p. 61, [arXiv:0806.2133].
- Pre-prints and Reports:
 - J. Edsjö and **A. H. G. Peter**, “Comments on recent work on dark-matter capture in the Solar System”, arXiv:1004.5258.
 - **A. H. G. Peter**, “Constraints on Self-Interacting Dark Matter from the $M_{\text{BH}}-V_{\text{circ}}$ Relation”, <http://www.astro.caltech.edu/~apeter/advproj.ps> (Advanced Project Report, Princeton University, supervised by Paul Steinhardt).
 - **A. H. G. Peter**, “Low Cross-Polarization W-Band Lens for CAPMAP”, http://www.astro.caltech.edu/~apeter/Annika_exp_proj2.ps (Experimental Project Report, Princeton University, supervised by Suzanne Staggs).

Invited Talks

- “Dark Matter”, Frank N. Bash Symposium, University of Texas, Austin, TX, October 10-11, 2011.
- “WIMP Astronomy”, Dark Matter from Every Direction workshop, McGill University, Montreal, Canada, April 2, 2011.
- “The Landscape of Dark-Matter Identification Efforts”, Theoretical High Energy Physics Seminar, University of Southern California, March 2, 2011.
- “Dark Matters”, UC San Diego astrophysics seminar, La Jolla, CA, October 13, 2010.
- “Dark-Matter Astrophysics in the Solar System”, Novel Searches for Dark Matter workshop, CCAPP, The Ohio State University, Columbus, OH, July 5-6, 2010.
- “Getting the most out of dark matter observations and experiments”, Perimeter Institute, Waterloo, ON, Canada, May 3, 2010.
- “Getting the most out of dark matter observations and experiments”, Oskar Klein Centre, Stockholm University, Stockholm, Sweden, April 27, 2010.
- “Getting the most out of dark matter observations and experiments”, KIPAC cosmology seminar, Stanford, CA, January 25, 2010.
- “Getting the most out of dark matter observations and experiments”, CCAPP seminar, The Ohio State University, Columbus, OH, November 3, 2009.
- “Getting the most out of dark matter observations and experiments”, UC Irvine Astrophysics Seminar, Irvine, CA, October 13, 2009.
- “Dark Matter on the Smallest Scales”, Keck Institute for Space Studies Mini Study Program: Shedding Light on the Nature of Dark Matter, Pasadena, CA, July 13-24, 2009.
- “Dynamics of dark matter bound to the solar system (and why it matters for indirect detection)”, XLIVth Rencontres de Moriond, La Thuile, Italy, March 7-14, 2009.

- “Dynamics of WIMPs in the Solar System”, Tea Talk Seminar, Caltech, Pasadena, CA, May 12, 2008.

Contributed or Informal Talks

- “WIMP astronomy with liquid-noble and cryogenic direct-detection experiments”, TeV Particle Astrophysics, Stockholm University, Stockholm, Sweden, August 1-5, 2011.
- “Dark matter decays and constraints”, Theoretical Astrophysics in Southern California meeting, Pasadena, CA, October 29, 2010.
- “Constraints on decaying-dark-matter models from simulations of isolated halos”, Identification of Dark Matter 2010, Montpellier, France, July 26-30, 2010.
- “XENON100 First Results & Ensuing ArXiv War” (with Jeff Filippini), Caltech Dark Matter Discussion Group, Pasadena, CA, June 8, 2010.
- “Constraints on Decaying Dark Matter Models From Simulations of Isolated Halos”, 215th Meeting of the American Astronomical Society, Washington, DC, January 3-7, 2010.
- “Getting the most out of dark matter observations and experiments”, Theoretical Astrophysics in Southern California meeting, Los Angeles, CA, October 23, 2009.
- “Astrophysical Systematics for Dark Matter Detection in the Solar System”, Pasadena Postdoc Conference, Lake Arrowhead, CA, April 15-17, 2009.
- “Dynamics of WIMPs in the Solar System and Implications for Direct and Indirect Detection”, COSMO 08, Madison, WI, August 25 - 29, 2008.
- “Dynamics of WIMPs in the Solar System and Implications for Direct and Indirect Detection”, 7th International Workshop on the Identification of Dark Matter, Stockholm, Sweden, August 18-22, 2008.
- “Morphology-Density at $z=2.3$ ”, Gravity Group Seminar, Princeton University, Princeton, NJ, April 13, 2007.
- “Simulations of Dark Matter Bound to the Solar System”, 209th Meeting of the American Astronomical Society, Seattle, WA, January 7, 2007.
- “A Population of Dark Matter Bound to the Solar System”, 6th International Workshop on the Identification of Dark Matter, Rhodes, Greece, September 11-16, 2006.
- “A Tutorial in Orbit Integration Methods,” Gravity Group Seminar, Princeton University, Princeton, NJ, October 28, 2005.
- “Can large neutrino asymmetries reconcile primordial nucleosynthesis and the cosmic microwave background?”, 122nd American Association of Physics Teachers National Meeting, January 6-11, 2001.

Posters

- “WIMP astronomy with liquid-noble and cryogenic direct-detection experiments”, INPAC meeting, Asilomar, CA, April 23, 2011.
- “Ionization Mechanisms of Four LINER 2s”, 199th Meeting of the American Astronomical Society, January 6-10, 2002.
- “Big Bang Nucleosynthesis as a Probe of Neutrino Degeneracy”, 2000 Fall Meeting of the Division of Nuclear Physics, October 4-7, 2000.

Other Conferences/Summer Schools Attended

- October 13-14, 2011, “Detecting Dark Matter with Gamma Rays”, SLAC, Menlo Park, CA.
- August 8-12, 2011: Santa Cruz Galaxy Workshop, University of California, Santa Cruz.
- December 15, 2010: Fermi Regional Workshop, University of California, Santa Cruz.
- January 17 - 23, 2010: The Revolution in Particle Physics is Here, Aspen Physics Institute, Aspen, CO.

- February 26 - 28, 2009: Construction and Evolution of the Galaxy: New Surveys and New Perspectives, Princeton University, Princeton, NJ.
- September 29 - October 3, 2008: Back to the Galaxy II, KITP, Santa Barbara, CA.
- May 31 - June 4 2005: Conference on Computational Cosmology, ICTP, Trieste, Italy.
- June 30 - July 11 2003: Prospects in Theoretical Physics, IAS, Princeton, NJ.

References

Upon request