

Jason Gallicchio

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EDUCATION

- 2011 **Ph.D.** in Physics, Harvard
- 2001 **M.S.** in Electrical Engineering, University of Illinois, Urbana-Champaign
- 1999 **B.S.** in Electrical and Computer Engineering, University of Illinois, Urbana-Champaign

PROFESSIONAL APPOINTMENTS

- 2016- **Assistant Professor** Harvey Mudd College
- 2014-2015 **Associate Fellow** University of Chicago Kavli Institute for Cosmological Physics; working with John Carlstrom on the South Pole Telescope
- 2013 **Station Science Leader**, Amundsen-Scott South Pole Station, Winterover for the South Pole Telescope, and NSF liaison for 10 scientists.
- 2011-2012 **Postdoc** in Theoretical Particle Physics, University of California, Davis

PUBLICATIONS

- 2016 Whitehorn, et. al. [SPTpol Collaboration] (2016). Millimeter Transient Point Sources in the SPTpol 100 Square Degree Survey. *ArXiv e-prints*
- 2015 Keisler, et. al. [SPTpol Collaboration] (2015). Measurements of Sub-degree B-mode Polarization in the Cosmic Microwave Background from 100 Square Degrees of SPTpol Data. *Astrophysical Journal*, 807:151
- Story, et. al. [SPTpol Collaboration] (2015). A Measurement of the Cosmic Microwave Background Gravitational Lensing Potential from 100 Square Degrees of SPTpol Data. *Astrophysical Journal*, 810:50
- Abazajian, et. al. (2015b). Neutrino physics from the cosmic microwave background and large scale structure. *Astroparticle Physics*, 63:66–80

- Abazajian, et. al. (2015a). Inflation physics from the cosmic microwave background and large scale structure. *Astroparticle Physics*, 63:55–65
- Friedman, A. S., Gallicchio, J., Kaiser, D. I., and Guth, A. H. (2015). Testing Quantum Mechanics and Bell’s Inequality with Astronomical Observations. In *American Astronomical Society Meeting Abstracts*, volume 225 of *American Astronomical Society Meeting Abstracts*
- Keisler, et. al. [SPTpol Collaboration] (2015). Measurements of Sub-degree B-mode Polarization in the Cosmic Microwave Background from 100 Square Degrees of SPTpol Data. *Astrophysical Journal*, 807:151
- Crites, et. al. [SPTpol Collaboration] (2015). Measurements of E-Mode Polarization and Temperature-E-Mode Correlation in the Cosmic Microwave Background from 100 Square Degrees of SPTpol Data. *Astrophysical Journal*, 805:36
- 2014 Gallicchio, J., Friedman, A. S., and Kaiser, D. I. (2014). Testing Bell’s Inequality with Cosmic Photons: Closing the Setting-Independence Loophole. *Physical Review Letters*, 112(11):110405
- 2013 Hanson, et. al. [SPTpol Collaboration] (2013). Detection of B-Mode Polarization in the Cosmic Microwave Background with Data from the South Pole Telescope. *Physical Review Letters*, 111(14):141301
- Friedman, A. S., Kaiser, D. I., and Gallicchio, J. (2013). The shared causal pasts and futures of cosmological events. *Physical Review D*, 88(4):044038
- Bai, Y., Cheng, H.-C., Gallicchio, J., and Gu, J. (2013). A toolkit of the stop search via the chargino decay. *Journal of High Energy Physics*, 8:85
- Gallicchio, J. and Schwartz, M. D. (2013). Quark and gluon jet substructure. *Journal of High Energy Physics*, 4:90
- 2012 Bai, Y., Cheng, H.-C., Gallicchio, J., and Gu, J. (2012). Stop the top background of the stop search. *Journal of High Energy Physics*, 7:110
- Altheimer, et. al. (2012). Jet substructure at the Tevatron and LHC: new results, new tools, new benchmarks. *Journal of Physics G Nuclear Physics*, 39(6):063001

- 2011 Gallicchio, J. and Schwartz, M. D. (2011b). Quark and Gluon Tagging at the LHC. *Physical Review Letters*, 107(17):172001
- Gallicchio, J. and Schwartz, M. D. (2011a). Pure samples of quark and gluon jets at the LHC. *Journal of High Energy Physics*, 10:103
- Gallicchio, J., Huth, J., Kagan, M., Schwartz, M. D., Black, K., and Tweedie, B. (2011). Multivariate discrimination and the Higgs+W/Z search. *Journal of High Energy Physics*, 4:69
- Gallicchio, J. R. (2011). *A Multivariate Approach to Jet Substructure and Jet Superstructure*. PhD thesis, Harvard University
- 2010 Gallicchio, J. and Schwartz, M. D. (2010). Seeing in Color: Jet Superstructure. *Physical Review Letters*, 105(2):022001
- Gallicchio, J. and Mahbubani, R. (2010). Inflation on the brane with vanishing gravity. *Journal of High Energy Physics*, 4:68
- 2007 Howard, A., Horowitz, P., Mead, C., Sreetharan, P., Gallicchio, J., Howard, S., Coldwell, C., Zajac, J., and Sliski, A. (2007). Initial results from Harvard all-sky optical SETI. *Acta Astronautica*, 61:78–87
- 2006 Gallicchio, J. and Yavin, I. (2006). Curvature as a remedy or discretizing gravity in warped dimensions. *Journal of High Energy Physics*, 5:79
- 2002 Kraut, S., Gallicchio, J. R., and Brady, D. J. (2002). High-Resolution Direction Finding and Scan-Free Spectrum Estimation with Rotational-Shear Interferometric Sensor Arrays. In *Algorithms and Systems for Optical Information Processing VI*, pages 267–274
- 2000 Brady, D. J., Rittgers, A., Gallicchio, J. R., Stack, R. A., and Morrison, R. L. (2000). Sensing, communications, and processing budgets for tomographic distributed ground sensor arrays. In *Unattended Ground Sensor Technologies and Applications II*, pages 49–54

PRESENTATIONS

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| 2016 | Theoretical AstroPhysics Including Relativity and Cosmology (TAPIR) Seminar, Caltech, April 8,
“Using Quasars and the CMB to Probe Quantum Entanglement” |
| 2015 | University of Chicago High Energy Physics Seminar, Oct 1
“Using Quasars or the CMB to Test Quantum Entanglement”

High Energy Physics Seminar, Argonne National Lab, August 4,
“Using Quasars or the CMB to Test Quantum Entanglement”

Physics Colloquium, University of California Davis, May 18
“Science from the South Pole: Using cosmic sources to test entanglement”

Cosmology Seminar, MIT, April 14
“Using Quasars or the CMB to Test Entanglement”

Cosmology Seminar, University of California San Diego, March 6
“Using quasars or CMB to pick the basis in Bell Tests”

Experimental Cosmology Seminar, Caltech, March 5
“Cosmic Bell Experiment”

Physics Colloquium, Harvey Mudd College, March 4
“A Long Winter: CMB Polarization with the South Pole Telescope”

Theory Seminar, NASA Jet Propulsion Lab, March 2
“Cosmic Bell Experiment” |
| 2014 | Astronomy Colloquium, University of Toronto, October 24,
“Using quasars or CMB to pick the basis in Bell Tests”

Astronomy Seminar, Perimeter Institute, October 21
“A Long Winter: CMB Polarization with the South Pole Telescope”

Theoretical Astronomy Seminar, University of Illinois, October 8
“A Long Winter: CMB Polarization with the South Pole Telescope”

Welcome talk for <i>Cosmic Bell</i> meeting, NIST, Boulder, July 9
“Cosmic Bell Overview” |

- Seminar, University of Vienna hosted by Anton Zeilinger, June 23
 “Using quasars or CMB to pick the basis in Bell Tests”
- Seminar, Griffith University, Queensland, Australia. February 26
 “Cosmic Bell Experiment”
- 2012 Seminar, University of the Western Cape, Capetown, South Africa, Dec. 13
 “Cosmic Bell Experiment”
- Seminar, University of KwaZulu-Natal, Durban, South Africa, Dec. 12
 “Cosmic Bell Experiment”
- 2012 Talk at CERN-TH *Summer Institute on BSM Physics*, June 26
 “A Quark/Gluon Tagger”
- Invited talk at *Deep-Inelastic Scattering Bonn*, March 27
 “Constructing & Using a Quark/Gluon Tagger”
- 2011 Invited talk at *West Coast LHC Theory at SLAC* Stanford, December 9
 “Constructing & Using a Quark/Gluon Tagger”
- Invited talk *ATLAS West* at SLAC, Stanford, November 28
 “Gluon Tagging and Quark & Gluon Samples”
- Seminar *Theory Meets Experiment* UC Davis, September 27
 “Higgs and Jet Color-Connections”
- Invited talk *BOOST 2011* Princeton, May 24
 “Gluon Tagging and Quark & Gluon Samples”
- Theory Seminar at Harvard, April 6
 “Pure Quark and Gluon Samples for Gluon Tagging”
- Seminar at Michigan State, January 25
 “Jets: Color Connections and Gluon Tagging”
- Invited talk at *Boston Area Jet Workshop*, January 13
 “Quarks vs Gluons: How well can we distinguish at the LHC?”
- 2010 Seminar at Berkeley, November 15
 “New Observables and Multivariates for Higgs + Z or W”

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| 2009 | Seminar at Princeton, October 22
“New Observables and Multivariates for Higgs + Z or W” |
| 2009 | Invited talk in Japan at IPMU’s <i>Focus Week on QCD</i> , November 13
“Seeing in Color: sorting events by color superstructure” |
| 2007 | Conference Presentation at <i>SUSY09</i> Northeastern University, June 6
“Stabilized Brane Inflation without Warping” |
| 2007 | Colloquium at Mount Holyoke College, September 28
“Dark energy, cosmic inflation, and extra dimensions” |
| 2003 | Talk at <i>International Astronautical Congress</i> Bremen Germany, March 1
“Targeted and All Sky Optical SETI at Harvard” |

MEDIA COVERAGE

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| 2014 | “Is Quantum Entanglement Real?” by David Kaiser, <i>New York Times Sunday Review</i> November 14, 2014 |
| | “Can the Cosmos Test Quantum Entanglement?” by Andrew Friedman, <i>Astronomy Magazine</i> , Vol. 42, Issue 10, pg. 28-33, October 2014 |
| | “Astrophysics at the edge of the Earth” by Glenn Roberts, <i>Symmetry Magazine</i> , September 12, 2014 |
| | “Cosmic Test For Quantum Physics’ Last Major Loophole” by Bruce Dorminey, <i>Forbes</i> , June 18, 2014 |
| | “Bell’s Theorem: Closing the Loopholes” by Iulia Georgescu, <i>Nature Physics</i> 10, 248, April 1, 2014 |
| | “The Universe Made Me Do It? Testing ‘Free Will’ With Distant Quasars” by Andrew Friedman <i>NOVA, The Nature of Reality</i> , March 19, 2014 |
| | “Quasar Experiment May Shed Light on Quantum Physics and Free Will” by Charles Q. Choi, <i>NBC News</i> March 5, 2014 |
| | “Cosmic light could close quantum-weirdness loophole” by Zeeya Merali, <i>Nature</i> February 25, 2014 |

“Is entanglement real or is there a super-deterministic cosmic conspiracy?” by
Matthew Francis, *Ars Technica* February 21, 2014

TEACHING

Topics in Quantum Theory (“Jedi Quantum”) (Spring 2016; 15 students)
4th-year physics-major elective

Optics Laboratory (Spring 2016; 15 students)
3rd-year physics-major required lab

Mechanics and Wave Motion (Spring 2016; 36 students)
1st-year core for science and engineering majors. Sections.

Laboratory Electronics (Summer 2008, 2009, 2010; 10 students)
Lecturer for complete summer-version
TA with Paul Horowitz & Tom Hayes (Fall '02, Spring '03, Summer '03, Fall '05; 30 students)

Energy Science (Spring 2010; 10 students)
TA with Lene Hau; lecture notes still used; won “Certificate of Distinction in Teaching”

Quantum Mechanics I (Fall 2006; 20 students)
TA with Lene Hau; Nominated for “Joseph R. Levenson Memorial Teaching Prize”

Introductory Electromagnetism (Spring 2005; 50 students)
Head TA with Howard Georgi; Purcell-level; non-majors

Mechanics and Special Relativity (Fall 2004; 40 students)
Head TA with Howard Georgi; Lagrangians; advanced freshman

Physics Tutor (2004-2005) Non-Resident Tutor at Harvard’s Eliot House

Computer Engineering II: Embedded Systems (Fall 1999, Spring 2000; 60 students)
Head Teaching Assistant with John Lockwood

OUTREACH

2016	Science Day , Eastern Los Angeles, Claremont CA Interactive liquid nitrogen demos for a hundred 1st through 3rd graders
2015	Science Sunday , South Pole, Antarctica “10-Meter South Pole Telescope: Cosmology with Superconductors” Lyons Township High School , LaGrange, IL Winter at the South Pole
2014-2015	Adler Planetarium , Chicago Astronomy Conversations and Space Visualization Laboratory
2014	WHPK 88.5 FM , Chicago Community Radio Discussing entanglement and cosmology
1999-2001	Physics Van Science presentations to local grade schools

MEMBERSHIPS/AFFILIATIONS

2003+	American Physical Society
2003+	International Academy of Astronautics SETI Permanent Study Group
2005-2008	Dudley Fellow at Harvard University Organizing graduate student activities including speakers and rowing

INDUSTRY EXPERIENCE

1999	Silicon Graphics (SGI) ASIC design; Mountain View, CA
1998	Digital Equipment Corporation CAD tools for logic synthesis and verification of Alpha microprocessor; Shrewsbury, MA

REFERENCES

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