

Brian Koopman

CONTACT INFORMATION	Cornell University Physics Department Laboratory of Elementary Particle Physics 324 Physical Sciences Building Ithaca, NY 14850 USA	(607) 255-0833 bjk98@cornell.edu www.briankoopman.com
EDUCATION	Cornell University - Ithaca, NY Ph.D., Physics (Advisor: Prof. Michael Niemann) M.S., Physics	In Progress June 2015
	Clark University - Worcester, MA B.A., <i>summa cum laude</i> , with highest honors in Physics and Math GPA: 3.96 on a 4.00 scale	May 2012
RESEARCH INTERESTS	Study of the of cosmic microwave background (CMB). Current work includes hardware development for future upgrades to the Atacama Cosmology Telescope Polarimeter, ACTPol, a CMB telescope located in the Atacama Desert in Chile. This work includes optics design, detector assembly and measurement, nanofabrication and general data analysis.	
HONORS AND AWARDS	NASA Space Technology Research Fellow , NASA	2013 – Present
	Dean's List - First Academic Honors , Clark University	2008 – 2012
	Roy S. Andersen '43 Award , Clark University	2009
	Albert C. Erickson '30 Summer Research Award , Clark University	2009 – 2010
	Erickson Award for the Academic Year , Clark University	2010 – 2011
RESEARCH EXPERIENCE	Graduate Researcher , Cornell University, Ithaca, NY 14850	December 2012 – Present
	Conducting research in observation cosmology, specifically working with the Atacama Cosmology Telescope Polarimeter as I work towards my thesis.	
	Student Researcher , Clark University, Worcester, MA 01601	Sept. 2011 – May 2012
	Conducted research in experimental condensed matter, specifically Scanning Tunneling Microscopy (STM), under the guidance of Prof. Michael Boyer. Aided in construction of the new STM laboratory. Performed analysis of Fe doped $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ (Bi-2212) using custom software written for IDL.	
	Caltech REU Student , LIGO Livingston, Livingston, LA 70754	Summer 2011
	Researched piezoelectric actuators for use in the Output Mode Cleaner (OMC) of the Laser Interferometer Gravitational Wave Observatory (LIGO) under the guidance of Dr. Valera Frolov. Participated in optical path construction and alignment of experimental OMC with non-linear planar ring oscillator (NPRO), Nd:YAG, laser. Collection of data with LIGO data acquisition system and processing with MATLAB.	
	Student Researcher , Clark University, Worcester, MA 01601	Summer 2009, 2010
	Researched 1D antiferromagnetic chains $\text{Cu}_{(1-x)}\text{Zn}_{(x)}(3,5\text{-diClpy})_2\text{Cl}_2$ and $\text{Cu}(\text{Py})_2\text{Cl}_{2(1-x)}\text{Br}_{2(x)}$ under the guidance of Prof. Christopher Landee. Performed synthesis, simulation with the Algorithms and Libraries for Physics Simulations (ALPS), collected data using a SQUID Magnetometer and analyzed data using Origin 7.0.	

TEACHING
EXPERIENCE**Teaching Assistant**, Cornell University, Ithaca, NY 14850

PHYS2214 - Physics III: Oscillations, Waves, and Quantum Physics

Fall 2012

PHYS2213 - Physics II: Electromagnetism

Spring 2013**Teaching Assistant**, Clark University, Worcester, MA 01601

PHYS127 - Computer Simulations

Spring 2011

MATH217 - Probability and Statistics

Fall 2010, 2011

CS120 - Introduction to Computing

Fall 2009, 2010

PUBLICATIONS

8. Gallardo, P. A., Koopman, B., Cothard, N., et al. *Deep Reactive Ion Etched Anti-Reflection Coatings for Sub-millimeter Silicon Optics*, arXiv preprint (October 24, 2016); arXiv:1610.07655.
7. Louis, T., Grace, E., Hasselfield, H., et al. *The Atacama Cosmology Telescope: Two-Season ACTPol Spectra and Parameters*, arXiv preprint (October 7, 2016); arXiv:1610.02360.
6. Erdenemunkh, U., Koopman, B., Fu, L., et al. *Suppression of Superfluid Density and the Pseudogap State in the Cuprates by Impurities*, arXiv preprint (July 18, 2016); arXiv:1607.05238.
5. De Bernardis, F., Aiola, S., Vavagiakis, E. M., et al. *Detection of the pairwise kinematic Sunyaev-Zel'dovich effect with BOSS DR11 and the Atacama Cosmology Telescope*, (July 7, 2016); arXiv:1607.02139.
4. Thornton, R. J., Ade, P. A. R., Aiola, S., et al. *The Atacama Cosmology Telescope: The polarization-sensitive ACTPol instrument*, (May 21, 2016); arXiv:1605.06569.
3. Schaan, E., Ferraro, S., Vargas-Magaña, M., et al. *Evidence for the kinematic Sunyaev-Zel'dovich effect with ACTPol and velocity reconstruction from BOSS*, Phys. Rev. D 93, 082002, (April 11, 2016); doi:10.1103/PhysRevD.93.082002 arXiv:1510.06442
2. van Engelen, A., Sherwin, B. D., Sehgal, N., et al. *The Atacama Cosmology Telescope: Lensing of CMB Temperature and Polarization Derived from Cosmic Infrared Background Cross-Correlation*, ApJ, 808, 7 (July 20, 2015); doi:10.1088/0004-637X/808/1/7, arXiv:1412.0626.
1. Naess, S., Hasselfield, M., McMahon, J., et al. *The Atacama Cosmology Telescope: CMB Polarization at $200 < \ell < 9000$* , Journal of Cosmology and Astroparticle Physics 10(2014)007, (October 3, 2014); doi:10.1088/1475-7516/2014/10/007, arXiv:1405.5524.

CONFERENCE
PROCEEDINGS

17. Crowley, K. T., Choi, S., Kuan, J., et al. *Characterization of AlMn TES impedance, noise, and optical efficiency in the first 150 mm multichroic array for Advanced ACTPol*, Proc. SPIE 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 991431 (July 20, 2016); doi:10.1117/12.2231999.
16. Li, Y., Choi, S., Ho, S. P., et al. *Assembly and integration process of the first high density detector array for Atacama Cosmology Telescope*, Proc. SPIE 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 991435 (July 20, 2016); doi:10.1117/12.2233470.
15. Henderson, S. W., Stevens, J. R., Amiri, M., et al. *Readout of two-kilopixel transition-edge sensor arrays for Advanced ACTPol*, roc. SPIE 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 99141G (July 19, 2016); doi:10.1117/12.2233895, arXiv:1607.06064.
14. Rojas, P. A. F., Planella, R. D., Maurin, L., et al. *Far sidelobe effects from panel gaps of the Atacama Cosmology Telescope*, Proc. SPIE 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 99142Q (July 19, 2016); doi:10.1117/12.2231421.
13. Simon, S., Austermann, J., Beall, J. A., et al. *The design and characterization of wideband spline-profiled feedhorns for Advanced ACTPol*, Proc. SPIE 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 991416 (July 19, 2016); doi:10.1117/12.2233603.

12. Ward, J. T., Austermann, J., Beall, J. A., et al. *Mechanical designs and development of TES bolometer detector arrays for the Advanced ACTPol experiment*, Proc. SPIE 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 991437 (July 19, 2016); doi:10.1117/12.2233746.
11. De Bernardis, F., Stevens, J. R., Hasselfield, M., et al. *Survey strategy optimization for the Atacama Cosmology Telescope*, Proc. SPIE 9910, Observatory Operations: Strategies, Processes, and Systems VI, 991014 (July 7, 2016); doi:10.1117/12.2232824, arXiv:1607.02120.
10. Koopman, B., Austermann, J., Cho, H.-M., et al. *Optical modeling and polarization calibration for CMB measurements with ACTPol and Advanced ACTPol*, Proc. SPIE 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 99142T (July 6, 2016); doi:10.1117/12.2231912, arXiv:1607.01825.
9. Duff, S. M., Austermann, J., Beall, J. A. et al. *Advanced ACTPol Multichroic Polarimeter Array Fabrication Process for 150 mm Wafers*, Journal of Low Temperature Physics 184, 634 (March 22, 2016); doi:10.1007/s10909-016-1576-y.
8. Ho, S. P., Pappas, C. G., Austermann, J. et al. *The First Multichroic Polarimeter Array on the Atacama Cosmology Telescope: Characterization and Performance*, Journal of Low Temperature Physics 184, 559 (March 15, 2016); doi:10.1007/s10909-016-1573-1.
7. Pappas, C. G., Austermann, J., Beall, J. A., et al. *High-Density Superconducting Cables for Advanced ACTPol*, Journal of Low Temperature Physics, 184, 473 (January 11, 2016); doi:10.1007/s10909-015-1454-z.
6. Datta, R., Austermann, J., Beall, J. A., et al. *Design and Deployment of a Multichroic Polarimeter Array on the Atacama Cosmology Telescope*, Journal of Low Temperature Physics, 184, 568 (October 27, 2015); doi:10.1007/s10909-016-1553-5, arXiv:1510.07797.
5. Henderson, S. W., Allison, R., Austermann, J., et al. *Advanced ACTPol Cryogenic Detector Arrays and Readout*, Journal of Low Temperature Physics, 184, 772 (October 9, 2015); doi:10.1007/s10909-016-1575-z, arXiv:1510.02809v1.
4. Hubmayr, J., Austermann, J., Beall, J., et al. *Feedhorn-Coupled transition-edge superconducting bolometer arrays for cosmic microwave background Polarimetry*, 26th International Symposium on Space Terahertz Technology, ISSTT 2015. (March 2015).
3. Stacey, G.J., Parshley, S., Nikola, T., et al. *SWCam: the short wavelength camera for the CCAT Observatory*, Proc. SPIE 9153, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 915310L (August 19, 2014); doi:10.1117/12.2057101
2. Grace, E., Beall, J., Bond, J.R., et al. *ACTPol: on-sky performance and characterization*, Proc. SPIE 9153, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 915310 (July 23, 2014); doi:10.1117/12.2057243
1. Wheeler, J.D., Koopman, B., Gallardo, P., et al. *Antireflection coatings for submillimeter silicon lenses*, Proc. SPIE 9153, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VII, 91532Z (July 23, 2014); doi:10.1117/12.2057011

CONTRIBUTED TALKS

6. *Optical modeling and polarization calibration for CMB measurements with ACTPol and Advanced ACTPol*, SPIE Astronomical Telescopes and Instrumentation 2016, June 2016 (poster)
5. *Atacama Cosmology Telescope: Polarization calibration analysis for CMB measurements with ACTPol and Advanced ACTPol*, APS April Meeting 2015, April 2015
4. *Deep reactive ion etching of silicon anti-reflection coatings for sub-millimeter optics*, SPIE Astronomical Telescopes and Instrumentation 2014, June 2014 (poster)
3. *ACTPol: Status and preliminary CMB polarization results from the Atacama Cosmology Telescope*, APS April Meeting 2014, April 2014
2. *Development of Optics and Detectors for Advanced CMB Polarization Measurements*, Cornell Graduate Student Seminar, November 2013

1. *Scanning Tunneling Microscopy of Fe Doped $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$* , APS March Meeting 2012, February 2012

OUTREACH AND
SERVICE

Cornell Physics Graduate Society (PGS) Communications Officer
Organized PGS Outreach at Dragon Boat Festival
Organized PGS Outreach at Ithaca Festival
Expanding Your Horizons Conference Volunteer

2013 – 2014
Summer 2013
Summer 2013
2013