

Graeme Erik Addison

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Current Address:

William H. Miller III Dept. of Physics
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Employment:

2020— Associate Research Scientist, Johns Hopkins University (JHU), MD, USA
2015—2020 Assistant Research Scientist, Johns Hopkins University (JHU), MD, USA
2012—2015 Postdoctoral Fellow, University of British Columbia (UBC), BC, Canada

Education:

2009—2012 DPhil Astrophysics, University of Oxford, UK
Supervisor: Dr Joanna Dunkley
2005—2009 MPhys, First Class Honors, University of Oxford, UK

Awards and Grants:

2023— NASA Research Opportunities in Earth and Space Science (ROSES-22) Astrophysics Data Analysis Program (ADAP) grant [PI, 3yr; 450k \$US]
2022— NASA ROSES-21 ADAP grant [Co-I, 3yr; 450k \$US]
2021— NASA ROSES-20 ADAP grant [Co-I, 3yr; 400k \$US]
2020— NASA ROSES-19 ADAP grant [Co-I, 3yr; 400k \$US]
2019— NASA ROSES-18 ADAP grant [Co-I, 3yr; 400k \$US]
2017—2020 NASA ROSES-16 ADAP grant [Co-I, 3yr; 400k \$US]
2016—2019 NASA ROSES-15 ADAP grant [Co-I, 3yr; 400k \$US]
2012—2014 Canadian Institute for Theoretical Astrophysics (CITA) National Fellowship, hosted at UBC [2yr; 110k \$CA]

Selected Talks:

Jun 2022 Invited, “The Hubble Tension: 2022 Status”, University of the Western Cape Astro Seminar, South Africa
Jun 2021 Invited, “What’s Happening with the Hubble Tension?”, Weak Interactions and Neutrinos 2021 (WIN21), University of Minnesota, MN, USA
Mar 2021 Invited, “What’s Happening with the Hubble Tension?”, Queen Mary University of London Cosmology Seminar, UK
Jul 2019 Invited, “Tensions between the Early and the Late Universe”, Kavli Institute for Theoretical Physics (KITP), UC Santa Barbara, CA, USA
Jun 2019 Contributed, Euclid Consortium annual meeting, Helsinki, Finland

Supervision:

- 2020–2021 Mario Aguilar, PhD candidate, JHU
- 2017–2022 Joshua Kable, PhD candidate, JHU
- 2015–2021 Keisuke Osumi, PhD candidate, JHU
- 2015–2019 Yajing Huang, PhD candidate, JHU
- 2014–2015 Gavin Noble & George Stein, undergraduate research projects, UBC
- 2014–2015 Micah Brush, undergraduate research project, Simon Fraser University, BC, Canada
- 2011–2012 Justin Alsing & Michael Wilson, master's projects, University of Oxford; Alsing awarded Johnson Memorial Prize

Teaching:

- Jan 2016 “The Cosmic Microwave Background”, introduction lecture for “Radio Sky” intersession undergraduate class, JHU
- Nov 2015 “The Cosmic Microwave Background”, lecture for undergraduate cosmology course, JHU
- Nov 2014 “Introduction to Markov Chain Monte Carlo”, graduate astrophysics lecture, UBC
- 2012 Tutor for first-year undergraduate course Core Physics I: Classical Mechanics, Exeter College, University of Oxford; eight students, weekly 1h blackboard discussion plus 20 min tutorials in pairs

Professional Responsibilities:

- 2019–2020 Committee member, joint JHU/STSci Colloquium Series
- 2015– Archival Data Scientist for NASA's Legacy Archive for Microwave Background Data Analysis (LAMBDA) website and data archive
- 2014– Referee for Physical Review journals, Monthly Notices of the Royal Astronomical Society (MNRAS), and Reviews of Modern Physics
- Dec 2011 Interviewer for undergraduate physics admissions, Exeter College, University of Oxford

Collaboration Membership:

- 2018– Cosmology Large Angular Scale Surveyor (CLASS; ground-based CMB experiment designed at JHU)
- 2017– CMB-Stage 4 (planned US-led ground-based CMB experiment)
- 2015– Euclid Consortium (ESA-led satellite mission making spectroscopic and photometric galaxy clustering and weak lensing measurements)
- 2014–2015 Canadian Hydrogen Intensity Mapping Experiment (CHIME; collaboration between Canadian universities and Dominion Radio Astrophysical Observatory)
- 2010– Atacama Cosmology Telescope (ACT; US-led ground-based CMB experiment)

Publications

Main-author publications

* denotes student-led publications with GEA providing week-to-week supervision from conception of the project through publication

1. Weiland, J. L., **Addison, G. E.**, Bennett, C. L., Halpern, M., and Hinshaw, G., “Polarized Synchrotron Foreground Assessment for CMB Experiments”, *ApJ*, 936, 24 (2022)
2. Benevento, G., Kable, J. A., **Addison, G. E.**, and Bennett, C. L., “An Exploration of an Early Gravity Transition in Light of Cosmological Tensions”, *ApJ*, 935, 156 (2022)
3. **Addison, G. E.**, “High H_0 Values from CMB E-mode Data: A Clue for Resolving the Hubble Tension?”, *ApJL*, 912, L1 (2021)
4. *Osumi, K., Weiland, J. L., **Addison, G. E.**, and Bennett, C. L., “Limits on Polarized Dust Spectral Index Variations for CMB Foreground Analysis”, *ApJ*, 921, 175 (2021)
5. *Kable, J. A., **Addison, G. E.**, and Bennett, C. L., “Deconstructing the Planck TT Power Spectrum to Constrain Deviations from Λ CDM”, *ApJ*, 905, 164 (2020)
6. Petroff, M. A., **Addison, G. E.**, Bennett, C. L., and Weiland, J. L., “Full-sky Cosmic Microwave Background Foreground Cleaning Using Machine Learning”, *ApJ*, 903, 104 (2020)
7. Weiland, J. L., **Addison, G. E.**, Bennett, C. L., Halpern, M., and Hinshaw, G., “An Examination of Galactic Polarization with Application to the Planck TB Correlation”, *ApJ*, 893, 119 (2020)
8. Watts, D. J., **Addison, G. E.**, Bennett, C. L., and Weiland, J. L., “Beyond Optical Depth: Future Determination of Ionization History from the Cosmic Microwave Background”, *ApJ*, 889, 130 (2020)
9. *Kable, J. A., **Addison, G. E.**, and Bennett, C. L., “Analytic Calculation of Covariance between Cosmological Parameters from Correlated Data Sets, with an Application to SPTpol”, *ApJ*, 888, 26 (2020)
10. *Huang, Y., **Addison, G. E.**, and Bennett, C. L., “Accounting for Correlations When Fitting Extra Cosmological Parameters”, *ApJ*, 882, 124 (2019)
11. **Addison, G. E.**, Bennett, C. L., Jeong, D., Komatsu, E., and Weiland, J. L., “The Impact of Line Misidentification on Cosmological Constraints from Euclid and Other Spectroscopic Galaxy Surveys”, *ApJ*, 879, 15 (2019)
12. *Kable, J. A., **Addison, G. E.**, and Bennett, C. L., “Quantifying the CMB Degeneracy between the Matter Density and Hubble Constant in Current Experiments”, *ApJ*, 871, 77 (2019)
13. *Huang, Y., **Addison, G. E.**, Weiland, J. L., and Bennett, C. L., “Assessing Consistency between WMAP 9 Year and Planck 2015 Temperature Power Spectra”, *ApJ*, 869, 38 (2018)
14. Weiland, J. L., Osumi, K., **Addison, G. E.**, Bennett, C. L., Watts, D. J., Halpern, M., and Hinshaw, G., “Effect of Template Uncertainties on the WMAP and Planck Measures of the Optical Depth Due to Reionization”, *ApJ*, 863, 161 (2018)

15. **Addison, G. E.**, Watts, D. J., Bennett, C. L., Halpern, M., Hinshaw, G., and Weiland, J. L., “Elucidating Λ CDM: Impact of Baryon Acoustic Oscillation Measurements on the Hubble Constant Discrepancy”, *ApJ*, 853, 119 (2018)
16. **Addison, G. E.**, Huang, Y., Watts, D. J., Bennett, C. L., Halpern, M., Hinshaw, G., and Weiland, J. L., “Quantifying Discordance in the 2015 Planck CMB Spectrum”, *ApJ*, 818, 132 (2016)
17. Louis, T., **Addison, G. E.**, and 27 colleagues, “The Atacama Cosmology Telescope: cross correlation with Planck maps”, *JCAP*, 2014, 016 (2014)
18. **Addison, G. E.**, Dunkley, J., and Bond, J. R., “Constraining thermal dust emission in distant galaxies with number counts and angular power spectra”, *MNRAS*, 436, 1896 (2013)
19. **Addison, G. E.**, Hinshaw, G., and Halpern, M., “Cosmological constraints from baryon acoustic oscillations and clustering of large-scale structure”, *MNRAS*, 436, 1674 (2013)
20. Hincks, A. D., Hajian, A., and **Addison, G. E.**, “A high-significance measurement of correlation between unresolved IRAS sources and optically-selected galaxy clusters”, *JCAP*, 2013, 004 (2013)
21. **Addison, G. E.**, Dunkley, J., and Spergel, D. N., “Modelling the correlation between the thermal Sunyaev Zel’dovich effect and the cosmic infrared background”, *MNRAS*, 427, 1741 (2012)
22. **Addison, G. E.**, Dunkley, J., Hajian, A., Viero, and 14 colleagues, “Power-law Template for Infrared Point-source Clustering”, *ApJ*, 752, 120 (2012)

Additional-author publications

1. Abazajian, K., **Addison, G. E.**, Adshead, P., Ahmed, Z., Akerib, D., Ali, A., Allen, S. W., Alonso, D., and 227 colleagues, “CMB-S4: Forecasting Constraints on Primordial Gravitational Waves”, *ApJ*, 926, 54 (2022)
2. Aiola, S., Calabrese, E., Maurin, L., Naess, S., Schmitt, B. L., Abitbol, M. H., **Addison, G. E.**, and 133 colleagues, “The Atacama Cosmology Telescope: DR4 Maps and Cosmological Parameters”, *JCAP*, 2020, 047 (2020)
3. Choi, S. K., Hasselfield, M., Ho, S.-P. P., Koopman, B., Lungu, M., Abitbol, M. H., **Addison, G. E.**, and 132 colleagues, “The Atacama Cosmology Telescope: A Measurement of the Cosmic Microwave Background Power Spectra at 98 and 150 GHz”, *JCAP*, 2020, 045 (2020)
4. Madhavacheril, M. S., Hill, J. C., Næss, S., **Addison, G. E.**, and 52 colleagues, “Atacama Cosmology Telescope: Component-separated maps of CMB temperature and the thermal Sunyaev-Zel’dovich effect”, *PRD*, 102, 023534 (2020)
5. Gralla, M. B., Marriage, T. A., **Addison, G. E.**, and 30 colleagues, “Atacama Cosmology Telescope: Dusty Star-forming Galaxies and Active Galactic Nuclei in the Equatorial Survey”, *ApJ*, 893, 104 (2020)

6. Padilla, I. L., Eimer, J. R., Li, Y., **Addison, G. E.**, and 32 colleagues, “Two-year Cosmology Large Angular Scale Surveyor (CLASS) Observations: A Measurement of Circular Polarization at 40 GHz”, *ApJ*, 889, 105 (2020)
7. Hall, K. R., Zakamska, N. L., **Addison, G. E.**, and 23 colleagues, “Quantifying the thermal Sunyaev-Zel’dovich effect and excess millimetre emission in quasar environments”, *MNRAS*, 490, 2315 (2019)
8. Sherwin, B. D., van Engelen, A., Sehgal, N., Madhavacheril, M., **Addison, G. E.**, and 41 colleagues, “Two-season Atacama Cosmology Telescope polarimeter lensing power spectrum”, *PRD*, 95, 123529 (2017)
9. Louis, T., Grace, E., Hasselfield, M., Lungu, M., Maurin, L., **Addison, G. E.**, and 77 colleagues, “The Atacama Cosmology Telescope: two-season ACTPol spectra and parameters”, *JCAP*, 2017, 031 (2017)
10. van Engelen, A., Sherwin, B. D., Sehgal, N., **Addison, G. E.**, and 48 colleagues, “The Atacama Cosmology Telescope: Lensing of CMB Temperature and Polarization Derived from Cosmic Infrared Background Cross-correlation”, *ApJ*, 808, 7 (2015)
11. Hand, N., Leauthaud, A., Das, S., Sherwin, B. D., **Addison, G. E.**, and 31 colleagues, “First measurement of the cross-correlation of CMB lensing and galaxy lensing”, *PRD*, 91, 062001 (2015)
12. Gralla, M. B., Crichton, D., Marriage, T. A., Mo, W., Aguirre, P., **Addison, G. E.**, and 35 colleagues, “A measurement of the millimetre emission and the Sunyaev-Zel’dovich effect associated with low-frequency radio sources”, *MNRAS*, 445, 460 (2014)
13. Hill, J. C., Sherwin, B. D., Smith, K. M., **Addison, G. E.**, and 30 colleagues, “The Atacama Cosmology Telescope: A Measurement of the Thermal Sunyaev-Zel’dovich One-Point PDF”, *arXiv e-prints*, arXiv:1411.8004 (2014)
14. Naess, S., Hasselfield, M., McMahon, J., Niemack, M. D., **Addison, G. E.**, and 73 colleagues, “The Atacama Cosmology Telescope: CMB polarization at $200 < \ell < 9000$ ”, *JCAP*, 2014, 007 (2014)
15. Newburgh, L. B., **Addison, G. E.**, and 33 colleagues, “Calibrating CHIME: a new radio interferometer to probe dark energy”, *Proc. SPIE*, 9145, 91454V (2014)
16. Bandura, K., **Addison, G. E.**, and 32 colleagues, “Canadian Hydrogen Intensity Mapping Experiment (CHIME) pathfinder”, *Proc. SPIE*, 9145, 914522 (2014)
17. Marsden, D., Gralla, M., Marriage, T. A., Switzer, E. R., Partridge, B., Massardi, M., Morales, G., **Addison, G. E.**, and 23 colleagues, “The Atacama Cosmology Telescope: dusty star-forming galaxies and active galactic nuclei in the Southern survey”, *MNRAS*, 439, 1556 (2014)
18. Das, S., Louis, T., Nolta, M. R., **Addison, G. E.**, and 40 colleagues, “The Atacama Cosmology Telescope: temperature and gravitational lensing power spectrum measurements from three seasons of data”, *JCAP*, 2014, 014 (2014)

19. Viero, M. P., Asboth, V., Roseboom, I. G., Moncelsi, L., Marsden, G., Mentuch Cooper, E., Zemcov, M., **Addison, G. E.**, and 31 colleagues, “The Herschel Stripe 82 Survey (HerS): Maps and Early Catalog”, *ApJS*, 210, 22 (2014)
20. Sievers, J. L., Hlozek, R. A., Nolta, M. R., Acquaviva, V., **Addison, G. E.**, and 88 colleagues, “The Atacama Cosmology Telescope: cosmological parameters from three seasons of data”, *JCAP*, 2013, 060 (2013)
21. Dunkley, J., Calabrese, E., Sievers, J., **Addison, G. E.**, and 31 colleagues, “The Atacama Cosmology Telescope: likelihood for small-scale CMB data”, *JCAP*, 2013, 025 (2013)
22. Hasselfield, M., Hilton, M., Marriage, T. A., **Addison, G. E.**, and 40 colleagues, “The Atacama Cosmology Telescope: Sunyaev-Zel’dovich selected galaxy clusters at 148 GHz from three seasons of data”, *JCAP*, 2013, 008 (2013)
23. Viero, M. P., Wang, L., Zemcov, M., **Addison, G. E.**, and 50 colleagues, “HerMES: Cosmic Infrared Background Anisotropies and the Clustering of Dusty Star-forming Galaxies”, *ApJ*, 772, 77 (2013)
24. Sifón, C., Menanteau, F., Hasselfield, M., Marriage, T. A., Hughes, J. P., Barrientos, L. F., González, J., Infante, L., **Addison, G. E.**, and 27 colleagues, “The Atacama Cosmology Telescope: Dynamical Masses and Scaling Relations for a Sample of Massive Sunyaev-Zel’dovich Effect Selected Galaxy Clusters”, *ApJ*, 772, 25 (2013)
25. Sehgal, N., **Addison, G. E.**, and 34 colleagues, “The Atacama Cosmology Telescope: Relation between Galaxy Cluster Optical Richness and Sunyaev-Zel’dovich Effect”, *ApJ*, 767, 38 (2013)
26. Dünner, R., Hasselfield, M., Marriage, T. A., Sievers, J., Acquaviva, V., **Addison, G. E.**, and 68 colleagues, “The Atacama Cosmology Telescope: Data Characterization and Mapmaking”, *ApJ*, 762, 10 (2013)
27. Wilson, M. J., Sherwin, B. D., Hill, J. C., **Addison, G. E.**, and 34 colleagues, “Atacama Cosmology Telescope: A measurement of the thermal Sunyaev-Zel’dovich effect using the skewness of the CMB temperature distribution”, *PRD*, 86, 122005 (2012)
28. Sherwin, B. D., Das, S., Hajian, A., **Addison, G. E.**, and 27 colleagues, “The Atacama Cosmology Telescope: Cross-correlation of cosmic microwave background lensing and quasars”, *PRD*, 86, 083006 (2012)
29. Hand, N., **Addison, G. E.**, and 56 colleagues, “Evidence of Galaxy Cluster Motions with the Kinematic Sunyaev-Zel’dovich Effect”, *PRL*, 109, 041101 (2012)
30. Hlozek, R., Dunkley, J., **Addison, G. E.**, and 37 colleagues, “The Atacama Cosmology Telescope: A Measurement of the Primordial Power Spectrum”, *ApJ*, 749, 90 (2012)
31. Hajian, A., Viero, M. P., **Addison, G. E.**, and 43 colleagues, “Correlations in the (Sub)millimeter Background from ACT \times BLAST”, *ApJ*, 744, 40 (2012)

Other publications (not peer-reviewed)

1. Abazajian, K., Abdulghafour, A., **Addison, G. E.**, Adshead, P., Ahmed, Z., Ajello, M., Akerib, D., Allen, S. W., and 348 colleagues, “Snowmass 2021 CMB-S4 White Paper”, arXiv e-prints, arXiv:2203.08024 (2022)
2. The CMB-S4 Collaboration: Abazajian, K., **Addison, G. E.**, and 234 colleagues, “CMB-S4: Forecasting Constraints on Primordial Gravitational Waves”, arXiv e-prints, arXiv:2008.12619 (2020)
3. Abazajian, K., **Addison, G. E.**, and 223 colleagues, “CMB-S4 Science Case, Reference Design, and Project Plan”, arXiv e-prints, arXiv:1907.04473 (2019)
4. **Addison, G. E.**, Switzer, E. R., Greason, M. R., Griswold, T. B., Jaffe, T., Miller, N., Odegard, N. P., Prasad, U., and Weiland, J. L., “Legacy Archive for Microwave Background Data Analysis (LAMBDA): An Overview”, arXiv e-prints, arXiv:1905.08667 (2019)
5. Carlstrom, J., Abazajian, K., **Addison, G. E.**, and 221 colleagues, “CMB-S4”, BAAS, 51, 209 (2019)