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Education

Princeton University 2012 – 2018
Ph.D. in Physics
Advisor: Prof. Lyman Page

University of California, San Diego 2008 – 2012
B.S. in Physics, Magna Cum Laude

Appointments

Cornell University	NSF Astronomy and Astrophysics Postdoctoral Fellow	Oct. 2020 – present
Cornell University	Cornell Presidential Postdoctoral Fellow	Sept. 2018 – Oct. 2020
Princeton University	Postdoctoral Research Associate	Jun. 2018 – Sept. 2018

Awards

NSF Astronomy and Astrophysics Postdoctoral Fellowship	Oct. 2020
Cornell Presidential Postdoctoral Fellowship	Sept. 2018
Princeton Physics Department Teaching Award	Sept. 2014
UCSD Division of Physical Sciences Dean's Undergraduate Award for Excellence	Dec. 2011

Research Interests

- Cosmology, fundamental physics, and astrophysics.
- Instrumentation for cosmology and astrophysics experiments.
- Cosmological and astrophysical data analysis.

Invited Talks

KAIST	2022
University of Cologne	2022
Rencontres de Blois	2022
Growth of Structure webinar series (CMB session)	2021
Paris IJCLab seminar	2021
Cornell LEPP seminar	2021
UBC astronomy colloquium	2020
Kavli IPMU seminar	2020
Stanford KIPAC cosmology group meeting	2020

Service

Referee for publications in Monthly Notices of the Royal Astronomical Society, Journal of Low Temperature Physics, and Journal of Astronomical Telescopes, Instruments, and Systems.
Review panel for NASA Astrophysics Research and Analysis (APRA) and Strategic Astrophysics Technology (SAT) programs.
Publication Panel member for the Simons Observatory collaboration.

References

Michael Niemack
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Jo Dunkley
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Publications

Lead author or main science team member

1. Zhu, Y., Beringue, B., **Choi**, S. K., et al., Estimating the impact of foregrounds on the future detection of Rayleigh scattering. 2022, JCAP, 2022, 048
2. Hensley, B. S., Clark, S. E., Fanfani, V., et al., The Simons Observatory: Galactic Science Goals and Forecasts. 2022, ApJ, 929, 166
3. **Choi**, S. K., Duell, C. J., Austermann, J., et al., CCAT-Prime: Characterization of the First 280 GHz MKID Array for Prime-Cam. 2022, Journal of Low Temperature Physics, arXiv:2111.01055 [astro-ph.IM]
4. CCAT-Prime collaboration, Aravena, M., Austermann, J. E., et al., CCAT-prime Collaboration: Science Goals and Forecasts with Prime-Cam on the Fred Young Submillimeter Telescope. 2021, arXiv e-prints, arXiv:2107.10364
5. Li, Y., Austermann, J. E., Beall, J. A., et al., In Situ Performance of the Low Frequency Array for Advanced ACTPol. 2021a, IEEE Transactions on Applied Superconductivity, 31, 3063334
6. **Choi**, S. K., Hasselfield, M., Ho, S.-P. P., et al., The Atacama Cosmology Telescope: a measurement of the Cosmic Microwave Background power spectra at 98 and 150 GHz. 2020b, JCAP, 2020, 045
7. Aiola, S., Calabrese, E., Maurin, L., et al., The Atacama Cosmology Telescope: DR4 maps and cosmological parameters. 2020, JCAP, 2020, 047
8. **Choi**, S. K., Austermann, J., Basu, K., et al., Sensitivity of the Prime-Cam Instrument on the CCAT-Prime Telescope. 2020a, Journal of Low Temperature Physics, 199, 1089
9. Kim, C.-G., **Choi**, S. K., & Flauger, R., Dust Polarization Maps from TIGRESS: E/B Power Asymmetry and TE Correlation. 2019, ApJ, 880, 106
10. **Choi**, S. K., Austermann, J., Beall, J. A., et al., Characterization of the Mid-Frequency Arrays for Advanced ACTPol. 2018, Journal of Low Temperature Physics, 193, 267
11. Kusaka, A., Appel, J., Essinger-Hileman, T., et al., Results from the Atacama B-mode Search (ABS) experiment. 2018, JCAP, 2018, 005
12. Munson, C. D., **Choi**, S. K., Coughlin, K. P., et al., Composite reflective/absorptive IR-blocking filters embedded in metamaterial antireflection-coated silicon. 2017, Appl. Opt., 56, 5349
13. Ho, S.-P. P., Austermann, J., Beall, J. A., et al. 2017, Highly uniform 150 mm diameter multichroic polarimeter array deployed for CMB detection, in Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VIII, ed. W. S. Holland & J. Zmuidzinas, Vol. 9914, International Society for Optics and Photonics (SPIE), 301

14. Crowley, K. T., **Choi**, S. K., Kuan, J., et al. 2016, Characterization of AlMn TES impedance, noise, and optical efficiency in the first 150 mm multichroic array for Advanced ACTPol, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VIII, ed. W. S. Holland & J. Zmuidzinas, 991431
15. Li, Y., **Choi**, S., Ho, S.-P., et al. 2016, Assembly and integration process of the first high density detector array for the Atacama Cosmology Telescope, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VIII, ed. W. S. Holland & J. Zmuidzinas, 991435
16. **Choi**, S. K., & Page, L. A., Polarized galactic synchrotron and dust emission and their correlation. 2015, JCAP, 2015, 020

Collaboration member

1. Ebina, H., Keskitalo, R., Borrill, J., et al., Wide Field High Cadence CMB Survey Designs for Chilean Telescopes. 2022, arXiv e-prints, arXiv:2208.10070
2. Wang, Y., Bhandarkar, T., **Choi**, S. K., et al., Simons Observatory Focal-Plane Module: Detector Re-biasing With Bias-step Measurements. 2022, arXiv e-prints, arXiv:2208.05997
3. Huber, Z. B., **Choi**, S. K., Duell, C. J., et al., CCAT-prime: The Optical Design for the Epoch of Reionization Spectrometer. 2022b, arXiv e-prints, arXiv:2208.09521
4. Vavagiakis, E. M., Duell, C. J., Austermann, J., et al., CCAT-prime: Design of the Mod-Cam receiver and 280 GHz MKID instrument module. 2022, arXiv e-prints, arXiv:2208.05468
5. Huber, A. I., Chapman, S. C., Sinclair, A. K., et al., CCAT-prime: Optical and cryogenic design of the 850 GHz module for Prime-Cam. 2022a, arXiv e-prints, arXiv:2208.09560
6. Lungu, M., Storer, E. R., Hasselfield, M., et al., The Atacama Cosmology Telescope: measurement and analysis of 1D beams for DR4. 2022, JCAP, 2022, 044
7. Abazajian, K., Abdulghafour, A., Addison, G. E., et al., Snowmass 2021 CMB-S4 White Paper. 2022, arXiv e-prints, arXiv:2203.08024
8. Morris, T. W., Bustos, R., Calabrese, E., et al., The Atacama Cosmology Telescope: Modeling bulk atmospheric motion. 2022, Phys. Rev. D, 105, 042004
9. Healy, E., Dutcher, D., Atkins, Z., et al., The Simons Observatory 220 and 280 GHz Focal-Plane Module: Design and Initial Characterization. 2022, Journal of Low Temperature Physics, arXiv:2201.04507 [astro-ph.IM]
10. Naess, S., Aiola, S., Battaglia, N., et al., The Atacama Cosmology Telescope: A Search for Planet 9. 2021a, ApJ, 923, 224
11. Adhikari, S., Shin, T.-h., Jain, B., et al., Probing Galaxy Evolution in Massive Clusters Using ACT and DES: Splashback as a Cosmic Clock. 2021, ApJ, 923, 37
12. Li, Z., Louis, T., Calabrese, E., et al., The Simons Observatory: a new open-source power spectrum pipeline applied to the Planck legacy data. 2021b, arXiv e-prints, arXiv:2112.13839
13. McCarrick, H., Healy, E., Ahmed, Z., et al., The Simons Observatory Microwave SQUID Multiplexing Detector Module Design. 2021, ApJ, 922, 38
14. Guan, Y., Clark, S. E., Hensley, B. S., et al., The Atacama Cosmology Telescope: Microwave Intensity and Polarization Maps of the Galactic Center. 2021, ApJ, 920, 6
15. Orlowski-Scherer, J., Di Mascolo, L., Bhandarkar, T., et al., Atacama Cosmology Telescope measurements of a large sample of candidates from the Massive and Distant Clusters of WISE Survey. Sunyaev-Zeldovich effect confirmation of MaDCoWS candidates using ACT. 2021, AA, 653, A135
16. Zhu, N., Bhandarkar, T., Coppi, G., et al., The Simons Observatory Large Aperture Telescope Receiver. 2021, ApJS, 256, 23
17. Hill, J. C., Calabrese, E., Aiola, S., et al., Atacama Cosmology Telescope: Constraints on prerecombination early dark energy. 2022, Phys. Rev. D, 105, 123536
18. Vavagiakis, E. M., Gallardo, P. A., Calafut, V., et al., The Atacama Cosmology Telescope: Probing the baryon content of SDSS DR15 galaxies with the thermal and kinematic Sunyaev-Zel'dovich effects. 2021, Phys. Rev.

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20. Naess, S., Battaglia, N., Richard Bond, J., et al., The Atacama Cosmology Telescope: Detection of Millimeter-wave Transient Sources. 2021b, ApJ, 915, 14
21. Mallaby-Kay, M., Atkins, Z., Aiola, S., et al., The Atacama Cosmology Telescope: Summary of DR4 and DR5 Data Products and Data Access. 2021, ApJS, 255, 11
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23. Xu, Z., Adachi, S., Ade, P., et al., The Simons Observatory: The Large Aperture Telescope (LAT). 2021, Research Notes of the American Astronomical Society, 5, 100
24. Hilton, M., Sifón, C., Naess, S., et al., The Atacama Cosmology Telescope: A Catalog of ¿4000 Sunyaev-Zel'dovich Galaxy Clusters. 2021, ApJS, 253, 3
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27. Harrington, K., Sierra, C., Chesmore, G., et al., The Integration and Testing Program for the Simons Observatory Large Aperture Telescope Optics Tubes. 2021, arXiv e-prints, arXiv:2102.02129
28. Darwish, O., Madhavacheril, M. S., Sherwin, B. D., et al., The Atacama Cosmology Telescope: a CMB lensing mass map over 2100 square degrees of sky and its cross-correlation with BOSS-CMASS galaxies. 2021, MNRAS, 500, 2250
29. Han, D., Sehgal, N., MacInnis, A., et al., The Atacama Cosmology Telescope: delensed power spectra and parameters. 2021, JCAP, 2021, 031
30. Cothard, N. F., Ali, A. M., Austermann, J. E., et al. 2020a, Comparing complex impedance and bias step measurements of Simons Observatory transition edge sensors, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 11453, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 1145325
31. Xu, Z., Bhandarkar, T., Coppi, G., et al. 2020, The Simons Observatory: the Large Aperture Telescope Receiver (LATR) integration and validation results, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 11453, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 1145315
32. Koopman, B. J., Lashner, J., Saunders, L. J., et al. 2020, The Simons Observatory: overview of data acquisition, control, monitoring, and computer infrastructure, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 11452, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 1145208
33. Vavagiakis, E. M., Ahmed, Z., Ali, A., et al., The Simons Observatory: Magnetic Sensitivity Measurements of Microwave SQUID Multiplexers. 2020, arXiv e-prints, arXiv:2012.04532
34. Duell, C. J., Vavagiakis, E. M., Austermann, J., et al. 2020, CCAT-prime: Designs and status of the first light 280 GHz MKID array and mod-cam receiver, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 11453, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 114531F
35. Henke, D., Johnstone, D., Knee, L. B. G., et al. 2020, Optical design study for the 860 GHz first-light camera module of CCAT-p, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 11453, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 114532K
36. Naess, S., Aiola, S., Austermann, J. E., et al., The Atacama Cosmology Telescope: arcminute-resolution maps of 18 000 square degrees of the microwave sky from ACT 2008-2018 data combined with Planck. 2020, JCAP, 2020, 046
37. Madhavacheril, M. S., Sifón, C., Battaglia, N., et al., The Atacama Cosmology Telescope: Weighing Distant

Clusters with the Most Ancient Light. 2020b, ApJ, 903, L13

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40. Namikawa, T., Guan, Y., Darwish, O., et al., Atacama Cosmology Telescope: Constraints on cosmic birefringence. 2020, Phys. Rev. D, 101, 083527
41. Stevens, J. R., Cothard, N. F., Vavagiakis, E. M., et al., Characterization of Transition Edge Sensors for the Simons Observatory. 2020, Journal of Low Temperature Physics, 199, 672
42. Cothard, N. F., **Choi**, S. K., Duell, C. J., et al., The Design of the CCAT-prime Epoch of Reionization Spectrometer Instrument. 2020b, Journal of Low Temperature Physics, 199, 898
43. Terry, H., Battaglia, N., Basu, K., et al. 2019, The CCAT-Prime Submillimeter Observatory, in Bulletin of the American Astronomical Society, Vol. 51, 213
44. Lee, A., Abitbol, M. H., Adachi, S., et al. 2019, The Simons Observatory, in Bulletin of the American Astronomical Society, Vol. 51, 147
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48. Miyatake, H., Battaglia, N., Hilton, M., et al., Weak-lensing Mass Calibration of ACTPol Sunyaev-Zel'dovich Clusters with the Hyper Suprime-Cam Survey. 2019, ApJ, 875, 63
49. Ade, P., Aguirre, J., Ahmed, Z., et al., The Simons Observatory: science goals and forecasts. 2019, JCAP, 2019, 056
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51. Crowley, K. T., Austermann, J. E., **Choi**, S. K., et al., Advanced ACTPol TES Device Parameters and Noise Performance in Fielded Arrays. 2018, Journal of Low Temperature Physics, 193, 328
52. Coulton, W. R., Aiola, S., Battaglia, N., et al., Non-Gaussianity of secondary anisotropies from ACTPol and Planck. 2018, JCAP, 2018, 022
53. Simon, S. M., Golec, J. E., Ali, A., et al. 2018, Feedhorn development and scalability for Simons Observatory and beyond, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 10708, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy IX, ed. J. Zmuidzinas & J.-R. Gao, 107084B
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60. Simon, S. M., Appel, J. W., Campusano, L. E., et al., Characterizing Atacama B-mode Search Detectors with a Half-Wave Plate. 2016a, Journal of Low Temperature Physics, 184, 534

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62. Henderson, S. W., Allison, R., Austermann, J., et al., Advanced ACTPol Cryogenic Detector Arrays and Readout. 2016a, Journal of Low Temperature Physics, 184, 772

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65. Ward, J. T., Austermann, J., Beall, J. A., et al. 2016, Mechanical designs and development of TES bolometer detector arrays for the Advanced ACTPol experiment, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 9914, Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VIII, ed. W. S. Holland & J. Zmuidzinas, 991437

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