

Eve M. Vavagiakis

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RESEARCH INTERESTS

Cosmology and astrophysics, analysing maps of the cosmic microwave background (CMB) to study galaxy clusters, galaxy evolution, neutrinos, dark energy, and fundamental physics.
Cryogenic receivers and astronomical instrumentation, designing and developing cryogenic instrumentation for CMB and sub-mm measurements.
Applied superconductivity in cosmology/astronomical survey devices, measuring low-temperature devices including transition edge sensor bolometers and SQUIDs to study device physics and deploy next-generation detector arrays.

EDUCATION

Cornell University, Ithaca, NY
Ph.D., Physics 2021
Thesis: *Measuring the Sunyaev-Zel'dovich Effects with Current and Future Observatories*
M.S., Physics 2017
Cornell University, Ithaca, NY
B.A., Physics with Astronomy Concentration 2014

APPOINTMENTS

NSF Astronomy and Astrophysics Postdoctoral Fellow, Cornell University 2022 –
Postdoctoral Research Associate, Cornell University, Ithaca, NY 2021 – 2022
Graduate Research Assistant, Cornell University, Ithaca, NY 2019 – 2021
Provost Diversity Fellow, Cornell University, Ithaca, NY Spring 2021
NSF Graduate Research Fellow, Cornell University, Ithaca, NY 2015 – 2019
Advisor: Prof. Michael Niemack. Atacama Cosmology Telescope, CCAT-prime, CMB-S4, and Simons Observatory Collaborations
Research Fellow, Caltech, Pasadena, CA Fall 2014
Advisor: Prof. Jamie Bock. CIBER-2 project
Undergraduate Research Assistant, Cornell University, Ithaca, NY 2011 – 2014
Advisor: Prof. Gordon Stacey. SOFIA and ZEUS-2

HONORS AND AWARDS

National Science Foundation Astronomy and Astrophysics Postdoctoral Fellowship 2022 – 2025
Provost Diversity Fellowship, Cornell University 2021
National Science Foundation Graduate Research Fellowship 2014 – 2019
Stirling A. Colgate Travel Award 2017
Dr. Gerald A. Soffen Memorial Fund Travel Grant 2014
Cranson W. and Edna B. Shelley Award for Undergraduate Research in Astronomy 2013
Tony Alt Memorial Foundation Scholarship 2010 – 2014
Dean's List Scholar, Cornell University 2010 – 2013

RESEARCH COLLABORATIONS

- Advanced ACTPol** (2015 – Present): Analysis of CMB maps for cosmology and astrophysics. Screened TESes and SQUIDs, remotely observed using the Atacama Cosmology Telescope on Cerro Toco in northern Chile.
- CCAT-prime** (2017 – Present): Design and development of first light instrumentation for the Fred Young Submillimeter Telescope, a high-throughput 6-meter sub-mm and mm telescope on Cerro Chajnantor being built in northern Chile.
- CMB-S4** (2018 – Present): Superconducting film and detector testing for the next-generation ground-based CMB effort uniting the experimental cosmology community.
- Simons Observatory** (2016 – Present): Detector testing, magnetic shielding requirement development, cryogenic testbed development, and SZ analysis pipeline work for an array of CMB telescopes being built on Cerro Toco. Co-lead, Education and Public Engagement Working Group.

PAST RESEARCH COLLABORATIONS

- CIBER-2** (2014): Designing a shielding pop-up baffle for the second generation sounding rocket-borne Cosmic Infrared Background Experiment.
- SOFIA** (2011-2014): Designing and testing prototype Miniature Cryogenic Scanning Fabry-Perot (MCSF) interferometers for the FORCAST instrument on the Stratospheric Observatory for Infrared Astronomy.
- ZEUS-2** (2011): Writing a data reduction program for the second generation sub-mm grating spectrometer for the CSO and APEX.

PUBLICATIONS, MAIN AUTHOR

- 11) **E. M. Vavagiakis**, C. J. Duell et al. 2022. *CCAT-prime: Design of the Mod-Cam receiver and 280 GHz MKID instrument module*, Proc. SPIE, arXiv:2208.05468.
- 10) **E. M. Vavagiakis**, P. A. Gallardo, V. Calafut, S. Amodeo et al. 2021. *The Atacama Cosmology Telescope: Probing the Baryon Content of SDSS DR15 Galaxies with the Thermal and Kinematic Sunyaev-Zel'dovich Effects*, Phys. Rev. D 104, 043503, DOI:10.1103/PhysRevD.104.043503, arXiv:2101.08373.
- 9) V. Calafut, P. A. Gallardo, **E. M. Vavagiakis** et al. 2021. *The Atacama Cosmology Telescope: Detection of the Pairwise Kinematic Sunyaev-Zel'dovich Effect with SDSS DR15 Galaxies*, Phys. Rev. D 104, 043502, DOI:10.1103/PhysRevD.104.043502, arXiv:2101.08374.
- 8) C. J. Duell, **E. M. Vavagiakis** et al. 2020. *CCAT-prime: Designs and Status of the First Light 280 GHz MKID Array and Mod-Cam Receiver*, Proc. SPIE 11453, arXiv:2012.10411.
- 7) **E. M. Vavagiakis** et al. 2020. *The Simons Observatory: Magnetic Sensitivity Measurements of Microwave SQUID Multiplexers*, IEEE Transactions on Applied Superconductivity, 31, 5, DOI:10.1109/TASC.2021.3069294, arXiv:2012.04532.
- 6) **E. M. Vavagiakis**, N. F. Cothard, J. R. Stevens et al. 2019. *Developing AlMn films for Argonne TES fabrication*, Journal of Low Temperature Physics 199, 408–415, arXiv:1910.10199.
- 5) J. R. Stevens, N. F. Cothard, **E. M. Vavagiakis** et al. 2019. *Characterization of Transition Edge Sensors for the Simons Observatory*, Journal of Low Temperature Physics 199, 672–680,

arXiv:1912.00860.

- 4) **E. M. Vavagiakis** et al. 2018. *Prime-Cam: A first-light instrument for the CCAT-prime telescope*, Proc. SPIE 10708:107081U, arXiv:1807.00058.
- 3) **E. M. Vavagiakis**, S. W. Henderson, K. Zheng* et al. 2018. *Magnetic Sensitivity of AlMn TESes and Shielding Considerations for Next Generation CMB Surveys*, Journal of Low Temperature Physics 193, 288–297, arXiv:1710.08456.
- 2) F. De Bernardis, S. Aiola, **E. M. Vavagiakis**, M. D. Niemack, N. Battaglia et al. 2017. *Detection of the pairwise kinematic Sunyaev-Zel’dovich effect with BOSS DR11 and the Atacama Cosmology Telescope*, Journal of Cosmology and Astroparticle Physics 03, 008, arXiv:1607.02139.
- 1) S. C. Parshley, **E. M. Vavagiakis**, T. Nikola, G. J. Stacey 2014. *A Miniature Cryogenic Scanning Fabry-Perot Interferometer for Mid-IR to Submm Astronomical Observations*, Proc. SPIE 9147:914745, DOI:10.1117/12.2057169.

IN SUBMISSION

- 1) Z. Huber**, Y. Li, **E. M. Vavagiakis** et al. 2021. *The Simons Observatory: Magnetic Shielding Measurements for the Universal Multiplexing Module*, Submitted to the Journal of Low Temperature Physics, arXiv:2111.11495.

*= Undergraduate student mentee, **= Graduate student mentee

PRESENTATIONS

<i>Talk</i> , SPIE Astronomical Telescopes + Instrumentation Conference, Montreal, CA	2022
<i>Talk</i> , SZ Workshop, Flatiron Institute, NY, NY	2022
<i>Invited Colloquium</i> , UH Manoa Institute for Astronomy, Honolulu, HI	2022
<i>Talk</i> , APS April, NY, NY	2022
<i>Talk</i> , Cornell University Galaxy Lunch, Ithaca, NY	2022
<i>Invited Talk</i> , Kavli Institute for Particle Astrophysics & Cosmology Tea (Virtual)	2021
<i>Invited Talk</i> , CMB-S4 Collaboration Meeting (Virtual)	2021
<i>Invited Talk</i> , UC San Diego Cosmology Journal Club (Virtual)	2021
<i>Talk</i> , American Astronomical Society 238th Meeting (Virtual)	2021
<i>Invited Talk</i> , Max Planck Institute for Astrophysics Cosmology Seminar, Garching, Germany (Virtual)	2021
<i>Invited Talk</i> , CMB-S4 Collaboration Meeting (Virtual)	2021
<i>Talk</i> , Cornell University Astrophysics Lunch, Ithaca, NY (Virtual)	2021
<i>Poster</i> , Applied Superconductivity Conference (Virtual)	2020
<i>Invited Colloquium</i> , Wells College Science Colloquium, Aurora, NY	2019
<i>Invited Talk</i> , Tompkins Cortland Community College CollegeNow Professional Development Conference, Dryden, NY	2019
<i>Selected Poster</i> , Low Temperature Detectors Conference, Milan, Italy	2019
• Winner of Best Poster Video Award	
<i>Poster</i> , CMB-S4 Collaboration Meeting, Fermilab, IL	2019
<i>Talk</i> , SPIE Astronomical Telescopes + Instrumentation Conference, Austin, TX	2018
<i>Talk</i> , Center for Computational Astrophysics Cosmology Group Meeting, Flatiron Institute, New York, NY	2018
<i>Invited Talk</i> , St. Xavier’s College, Kathmandu, Nepal (Virtual)	2018

<i>Talk</i> , Cornell University Galaxy Lunch, Ithaca, NY	2018
<i>Talk</i> , APS DPF Conference, Fermilab, IL	2017
<i>Talk</i> , Cornell University Summer STEM Colloquium, Ithaca, NY	2017
<i>Talk</i> , American Astronomical Society 230th Meeting, Austin, TX	2017
<i>Talk</i> , Cornell University Astrophysics Lunch, Ithaca, NY	2016
<i>Poster</i> , SPIE Astronomical Telescopes + Instrumentation Conference, Montreal, CA	2014

MENTORSHIP

Hanzhi Tan, U. Chicago Class of 2024 <i>Simulated SZ clusters for deep learning</i>	2022 – Present
Ioana Cristescu, U. Richmond Class of 2024 <i>Simulated SZ clusters for deep learning</i>	2022 – Present
Brian Zhang, U. Chicago Class of 2025 <i>Simulated SZ clusters for deep learning</i>	2022 – Present
Rodrigo Freundt, Cornell Astronomy PhD student <i>Mod-Cam, Prime-Cam instrument module development</i>	2021 – Present
Ben Keller, Cornell Physics PhD student <i>Mod-Cam, Prime-Cam cryogenics and instrument module development</i>	2021 – Present
Zach Huber, Cornell Physics PhD student <i>Simons Observatory detector and readout testing; Mod-Cam, Prime-Cam development</i>	2020 – Present
Cody Duell, Cornell Physics PhD student <i>Detector and readout testing, cryogenics, instrumentation development</i>	2018 – Present
Photon Xu, Cornell Class of 2023 <i>Mod-Cam testing, cryogenic testbed development</i>	2021
Pedro Guicardi, Cornell Class of 2022 <i>Supplemental website development for CMB Data Analysis Summer School Jupyter notebooks</i>	2019 – 2020
Kshama Malavalli, Cornell Class of 2022 <i>Cryogenic testbed development and testing, supplemental website development for CMB Data Analysis Summer School Jupyter notebooks</i>	2019 – 2020
Dontae Milner, Simons-NSBP Scholar <i>CMB Data Analysis Summer School Jupyter notebooks and supplemental website testing</i>	Summer 2020
Willow Martin, Cornell Class of 2022 <i>Cryogenic testbed development and testing, mechanical design of testbed hardware</i>	2019 – 2020
Noah Sailer, Cornell Class of 2019 <i>Design and development of a cryogenic filter wheel test bed for Fourier Transform Spectrometry</i>	2017 – 2019
<ul style="list-style-type: none"> • Physics graduate student at UC Berkeley 	
Kaiwen Zheng, Cornell Class of 2018 <i>Magnetic shielding simulations and measurements, superconducting device testing, Python and Bash coding for lab testing automation</i>	2016 – 2018
<ul style="list-style-type: none"> • Physics graduate student at Princeton University 	
Tracy Paltoo, LSAMP Program, Adelphi University <i>Mechanical design of a magnetic shield for dilution refrigerator</i>	Summer 2016
<ul style="list-style-type: none"> • Project Analyst at a global civil engineering company 	
Prabudhya Bhattacharyya, Cornell Class of 2016 <i>Mechanical design of a cryogenic testbed MiniTec support frame</i>	2015 – 2016
<ul style="list-style-type: none"> • Physics graduate student at UC Berkeley 	

SERVICE

Co-lead, Education and Public Engagement Working Group, Simons Obs. <i>Public event planning, social media management, educational resources</i>	2020 – Present
Reviewer, <i>MIT Press</i>	2022
Co-organizer, LEPP Journal Club, Cornell University <i>Organizing the weekly seminar for the Laboratory for Elementary-Particle Physics</i>	2021 – 2022
Physical Sciences Building Group Safety Representative, Cornell University	2019 – 2021
Reviewer, <i>IEEE Transactions on Applied Superconductivity</i>	2020
Organizer, Cosmology Journal Club, Cornell University	2017 – 2019
Peer Reviewer, NSF GRFP Fellowship Review Sessions, Cornell University	2015 – 2019
Panelist, NSF GRFP Information Sessions, Cornell University	2017 – 2018
Panelist, Physics Graduate School Information Session, Cornell University	2015

TEACHING EXPERIENCE

Cornell University

<i>Grader</i> , Physics 3318: Analytical Mechanics	Spring 2021
<i>Grader</i> , Physics 3317: Applications of Quantum Mechanics	Fall 2016 – 2020
<i>Grader</i> , Physics 6562: Statistical Mechanics	Spring 2020
<i>Grader</i> , Physics 7645: Particle Physics	Spring 2018 – 2019
<i>Teaching Assistant</i> , Physics 3314: Intermediate Mechanics	Spring 2016
<i>Private Physics Tutor</i> , Physics 1102: Electricity, Magnetism and Waves	Spring 2016
<i>Teaching Assistant</i> , Physics 1101: Mechanics and Thermodynamics	Fall 2015
<i>Physics Tutor</i> , Learning Strategies Center	2012 – 2014
<i>Undergraduate Teaching Assistant</i> , Physics 1112: Mechanics	Spring 2011

California Institute of Technology

<i>Teaching Assistant</i> , Physics 1: Mechanics	Fall 2014
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TRAINING

APS-IDEA Simons Observatory Institutional Team <i>Developing strategic EDI goals for SO with the APS Inclusion, Diversity and Equity Alliance</i>	2020 – Present
APS-IDEA Workshops, Virtual	Spring, Fall 2021
NextGen Professors Program, Cornell University <i>Selective career development program for students and postdocs dedicated to advancing EDI</i>	2019 – 2020
Cornell Center for Teaching Innovation GET SET Workshops: <i>Writing a Teaching Statement, Grading Effectively, Using a Case-Study Approach to Teaching, Digital Storytelling, Incorporating Experiential Learning in Your Classes</i>	2019
Science Communication Workshop (COMM 5660), Cornell University	2019
ComSciCon-Cornell, Cornell University <i>Selective science communication workshop</i>	2018
CMB Data Analysis Summer School, University of Michigan	2016
Teaching and Learning Physics (PHYS 4484), Cornell University	2011

PUBLIC ENGAGEMENT

ParticleBites, the high energy physics reader's digest blog • Co-director (2018 – Present): <i>Post coordination and editing, writer recruitment, content</i>	2016 – Present
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planning, social media management

- Writer (2016 – 2018): *Summarizing recent particle physics and cosmology articles for an undergraduate level audience*

Member, Engagement, Mentorship, and Climate Committee, Simons Observatory	2017 – Present
<i>Lead role in Education and Public Engagement, Diversity and Inclusion initiatives</i>	
Social media: ACT, CCAT-prime, Simons Observatory, ParticleBites	2017 – Present
Reaching a global audience of >100,000/month	
Media interviews: Cornell Chronicle, WPRB 103.3 Princeton, WHCU 97.7 Ithaca,	2017 – 2022
Tidbits of Research podcast, Twinkl publishing house podcast	
Science on Tap, Ithaca, NY: Public outreach talk, audience of 55	2019
<i>Universal scales: Weighing tiny particles using the cosmos as a laboratory</i>	
Cornell University Xraise Outreach Program video development	2017 – 2018
<i>An introduction to the Cornell High Energy Synchrotron Source (CHESS)</i>	
Volunteer, Science Cabaret, Coltivare, Ithaca, NY	2017
<i>Microwave physics demonstrations for the public</i>	
Panelist, Cosmology and Cocktails, Fleet Science Center, San Diego, CA	2017
<i>Public event planned by the Simons Observatory EPE committee, audience of >200</i>	

K-12 OUTREACH

Creator, Organizer: Cosmology Day, Ithaca, NY	2019, 2021, 2022
<i>Annual laboratory tour and interactive panel event for high school students, communicating real step-by-step paths from high school to STEM careers in physics, astronomy or engineering</i>	
Guest Speaker, Girl Tales Podcast Taleblazer Weekend	2022
Expanding Your Horizons Conference, Cornell University	2015 – 2021
<i>One-day conference designed to stimulate 7th-9th grade girls' interest in STEM</i>	
• Conference Volunteer (2021)	
• Physics Workshop Instructor (2019)	
• Conference Buddy (2015)	
Volunteer, Cornell Center for Materials Research Educational Programs	2015 – 2020
<i>Educational programs and demonstrations for K-12 students, teachers, and the public</i>	
Tour Guide, Wilson Synchrotron Lab, CLASSE	2017 – 2019
<i>Leading public tours of the Cornell synchrotron facility</i>	
Cornell STEM Teacher Workshop tour, Ithaca, NY	2018
Cosmology lecture at Ithaca High School, Ithaca, NY	2018
<i>Looking back to the beginning: Experimental cosmology with ACT, Simons Observatory and CCAT-prime, audience of >30 students</i>	
Laboratory tour for New Settlement Housing Fund visiting students	2015
Focus For Teens Volunteer, Cornell University Department of Astronomy	2011, 2014
<i>4-H STEM career exploration event for high school students</i>	
Physics Instructor, Northern Lights Learning Cooperative, Ithaca, NY	Spring 2011

GROUPS AND ADVOCACY

Volunteer, Student Disability Services, Cornell University	2015 – 2021
<i>Advocacy for students with invisible disabilities</i>	
Member, Cornell Allergy and Asthma Awareness Club	2016 – 2017
Member, Caltech Graduate Student Council Advocacy Committee	Fall 2014
Member, Society of Physics Students, Cornell University	2010 – 2014

PUBLICATIONS, COLLABORATION

- 65) A. Sinclair et al. (incl. **E. M. Vavagiakis**) 2022, *CCAT-prime: RFSOC Based Readout for Frequency Multiplexed Kinetic Inductance Detectors*, Proc. SPIE, arXiv:2208.07465.
- 64) B. Zou et al. (incl. **E. M. Vavagiakis**) 2022, *CCAT-prime: The Design and Characterization of the Silicon Mirrors for the Fabry-Perot Interferometer in the Epoch of Reionization Spectrometer*, Proc. SPIE, arXiv:2207.08318.
- 63) E. Healy et al. (incl. **E. M. Vavagiakis**) 2022, *The Simons Observatory 220 and 280 GHz Focal-Plane Module: Design and Initial Characterization*, J. Low Temp Phys, DOI:10.1007/s10909-022-02788-8, arXiv:2201.04507.
- 62) J. Connors et al. (incl. **E. M. Vavagiakis**) 2022, *Magnetic Field Sensitivity of Microwave SQUID Multiplexers*, J. Low Temp Phys, DOI:10.1007/s10909-022-02806-9.
- 61) S. K. Choi, C. J. Duell et al. (incl. **E. M. Vavagiakis**) 2022, *CCAT-prime: Characterization of the First 280 GHz MKID Array for Prime-Cam*, J. Low Temp Phys, DOI:10.1007/s10909-022-02787-9, arXiv:2111.01055.
- 60) The CMB-S4 Collaboration (incl. **E. M. Vavagiakis**) 2021, *Snowmass 2021 CMB-S4 White Paper*, Submitted to the Proceedings of the US Community Study on the Future of Particle Physics (Snowmass 2021), arXiv:2112.01458.
- 59) J. C. Hill, E. Calabrese et al. (incl. **E. M. Vavagiakis**) 2021, *The Atacama Cosmology Telescope: Constraints on Pre-Recombination Early Dark Energy*, Phys. Rev. D 105, 123536, DOI:10.1103/physrevd.105.123536, arXiv:2109.04451.
- 58) H. McCarrick, E. Healy et al. (incl. **E. M. Vavagiakis**) 2021, *The Simons Observatory microwave SQUID multiplexing detector module design*, ApJ 922 38, DOI:10.3847/1538-4357/ac2232, arXiv:2106.14797.
- 57) T. Shin et al. (incl. **E. M. Vavagiakis**) 2021, *The mass and galaxy distribution around SZ-selected clusters*, MNRAS, 507, 4, DOI:10.1093/mnras/stab2505, arXiv:2105.05914.
- 56) J. Orlowski-Scherer, L. Di Mascolo, T. Bhandarkar, A. Manduca, T. Mroczkowski et al. (incl. **E. M. Vavagiakis**) 2021, *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*, A&A 653, A135, DOI:10.1051/0004-6361/202141200, arXiv:2105.00068.
- 55) Y. Guan, S. E. Clark, B. S. Hensley, P. A. Gallardo, S. Naess, C. J. Duell et al. (incl. **E. M. Vavagiakis**) 2021, *The Atacama Cosmology Telescope: Microwave Intensity and Polarization Maps of the Galactic Center*, ApJ, 920, 6, DOI:10.3847/1538-4357/ac133f, arXiv:2105.05267.
- 54) Z. Xu et al. (incl. **E. M. Vavagiakis**) 2021, *The Simons Observatory: the Large Aperture Telescope (LAT)*, Res. Notes AAS 5 100, arXiv:2104.09511.
- 53) N. Zhu et al. (incl. **E. M. Vavagiakis**) 2021, *The Simons Observatory Large Aperture Telescope Receiver*, ApJS 256, 23, DOI:10.3847/1538-4365/ac0db7, arXiv:2103.02747.
- 52) S. Amodeo, N. Battaglia, E. Schaan, S. Ferraro, E. Moser et al. (incl. **E. M. Vavagiakis**) 2021. *The Atacama Cosmology Telescope: Modelling the Gas Thermodynamics in BOSS CMASS*

galaxies from Kinematic and Thermal Sunyaev-Zel'dovich Measurements, Phys. Rev. D 103, 063514, DOI:10.1103/PhysRevD.103.063514, arXiv:2009.05558.

51) E. Schaan, S. Ferraro, S. Amodeo, N. Battaglia et al. (incl. **E. M. Vavagiakis**) 2021. *The Atacama Cosmology Telescope: Combined kinematic and thermal Sunyaev-Zel'dovich measurements from BOSS CMASS and LOWZ halo*, Phys. Rev. D 103, 063513, DOI:10.1103/PhysRevD.103.063513, arXiv:2009.05557.

50) Y. Li et al. (incl. **E. M. Vavagiakis**) 2021. *In situ Performance of the Low Frequency Array for Advanced ACTPol*, IEEE Transactions on Applied Superconductivity, 31 (5), DOI:10.1109/TASC.2021.3063334, arXiv:2101.02658.

49) M. Hilton et al. (incl. **E. M. Vavagiakis**) 2021. *The Atacama Cosmology Telescope: A Catalog of >4000 Sunyaev-Zel'dovich Galaxy Clusters*, ApJS 253 (1), DOI:10.3847/1538-4365/abd023, arXiv:2009.11043.

48) Z. Xu et al. (incl. **E. M. Vavagiakis**) 2020. *The Simons Observatory: the Large Aperture Telescope Receiver (LATR) integration and validation results*, Proc. SPIE. 11453:1145315, arXiv:2012.07862.

47) E. Healy et al. (incl. **E. M. Vavagiakis**) 2022. *Assembly development for the Simons Observatory focal plane readout module*, Proc. SPIE 11453:1145317, DOI:10.1117/12.2561743, arXiv:2204.05869.

46) J. Seibert et al. (incl. **E. M. Vavagiakis**) 2020. *Development of an optical detector testbed for the Simons Observatory*, Proc. SPIE 11453:114532C, DOI:10.1117/12.2562045.

45) K. Harrington, C. Sierra, G. Chesmore, S. Sutariya et al. (incl. **E. M. Vavagiakis**) 2020. *The integration and testing program for the Simons Observatory Large Aperture Telescope optics tubes*, Proc. SPIE 11453:1145318, DOI:10.1117/12.2562647, arXiv:2102.02129.

44) D. Henke et al. (incl. **E. M. Vavagiakis**) 2020. *Optical design study for the 860 GHz first-light camera module of CCAT-p*, Proc. SPIE 11453:114532K, DOI:10.1117/12.2560695.

43) N. F. Cothard et al. (incl. **E. M. Vavagiakis**) 2020. *Comparing complex impedance and bias step measurements of Simons Observatory transition edge sensors*, Proc. SPIE 11453:1145325, arXiv:2012.08547.

42) M. S. Madhavacheril et al. (incl. **E. M. Vavagiakis**) 2020. *The Atacama Cosmology Telescope: Weighing distant clusters with the most ancient light*, ApJL 903, L13, arXiv:2009.07772.

41) CMB-S4 Collaboration (incl. **E. M. Vavagiakis**) 2020. *CMB-S4: Forecasting Constraints on Primordial Gravitational Waves*, arXiv:2008.12619.

- 40) S. Naess et al. (incl. **E. M. Vavagiakis**) 2020. *The Atacama Cosmology Telescope: arcminute-resolution maps of 18,000 square degrees of the microwave sky from ACT 2008-2018 data combined with Planck*, JCAP 2020, 046, arXiv:2007.07290.
- 39) S. K. Choi et al. (incl. **E. M. Vavagiakis**) 2020. *The Atacama Cosmology Telescope: A Measurement of the Cosmic Microwave Background Power Spectra at 98 and 150 GHz*. JCAP 2020, 045, arXiv:2007.07289.
- 38) S. Aiola et al. (incl. **E. M. Vavagiakis**) 2020. *The Atacama Cosmology Telescope: DR4 Maps and Cosmological Parameters*, JCAP 2020, 047, arXiv:2007.07288.
- 37) A. Suzuki et al. (incl. **E. M. Vavagiakis**) 2020. *Commercially Fabricated Antenna-Coupled Transition Edge Sensor Bolometer Detectors for Next-Generation Cosmic Microwave Background Polarimetry Experiment*, Journal of Low Temperature Physics 199, 1158–1166, arXiv:1912.12782.
- 36) M. S. Madhavacheril, J. C. Hill, S. Naess et al. (incl. **E. M. Vavagiakis**) 2019. *The Atacama Cosmology Telescope: Component-separated maps of CMB temperature and the thermal Sunyaev-Zel'dovich effect*, Phys.Rev.D 102 2, 023534, arXiv:1911.05717.
- 35) S. Choi et al. (incl. **E. M. Vavagiakis**) 2019. *Sensitivity of the Prime-Cam Instrument on the CCAT-prime Telescope*, Journal of Low Temperature Physics, arXiv:1908.10451.
- 34) N. F. Cothard et al. (incl. **E. M. Vavagiakis**) 2019. *The Design of The CCAT-Prime Epoch of Reionization Spectrometer Instrument*, Journal of Low Temperature Physics, arXiv:1911.11687.
- 33) M. S. Rao, M. Silva-Feaver et al. (incl. **E. M. Vavagiakis**) 2019. *Simons Observatory Microwave SQUID Multiplexing Readout - Cryogenic RF Amplifier and Coax Chain Design*, Journal of Low Temperature Physics 199, 807-816, arXiv:2003.08949.
- 32) Y. Li et al. (incl. **E. M. Vavagiakis**) 2019. *Assembly and Integration Process for the High-Density Detector Array Readout Modules for the Simons Observatory*, Journal of Low Temperature Physics 199, 985-993, DOI:10.1007/s10909-020-02386-6.
- 31) The Simons Observatory Collaboration (incl. **E. M. Vavagiakis**) 2019. *The Simons Observatory: Astro2020 Decadal Project Whitepaper*, Astro2020 Decadal Project White Paper, arXiv:1907.08284.
- 30) K. Basu et al. (incl. **E. M. Vavagiakis**) 2019. *“SZ spectroscopy” in the coming decade: Galaxy cluster cosmology and astrophysics in the submillimeter*, Astro2020 Decadal Project White Paper, arXiv:1903.04944.
- 29) The CCAT-prime Collaboration (incl. **E. M. Vavagiakis**) 2019. *The CCAT-Prime Submillimeter Observatory*, Astro2020 APC White Paper, arXiv:1909.02587.
- 28) The Simons Observatory Collaboration (incl. **E. M. Vavagiakis**) 2018. *The Simons Observatory: Science goals and forecasts*, Journal of Cosmology and Astroparticle Physics 1902, 056, arXiv:1808.07445.
- 27) G. Coppi, Z. Xu, et al. (incl. **E. M. Vavagiakis**) 2018. *Cooldown strategies and transient thermal simulations for the Simons Observatory*, Proc. SPIE 10708, arXiv:1808.07896.
- 26) N. F. Cothard et al. (incl. **E. M. Vavagiakis**) 2018. *Optimizing the efficiency of Fabry-Perot interferometers with silicon-substrate mirrors*, Proc. SPIE 10706, arXiv:1807.06019.

- 25) S. R. Dicker, P. A. Gallardo, P. D. Mauskopf, J. E. Gudmundsson, et al. (incl. **E. M. Vavagiakis**) 2018. *Cold optical design for the large aperture Simons' Observatory telescope*, Proc. SPIE 10700, arXiv:1808.05058.
- 24) P. A. Gallardo, J. Gudmundsson, B. J. Koopman, F. T. Matsuda, S. M. Simon, et al. (incl. **E. M. Vavagiakis**) 2018. *Systematic uncertainties in the Simons Observatory: optical effects and sensitivity considerations*, Proc. SPIE 10708, arXiv:1808.05152.
- 23) J. L. Orlowski-Scherer, N. Zhu, Z. Xu et al. (incl. **E. M. Vavagiakis**) 2018. *Simons Observatory large aperture receiver simulation overview*, Proc. SPIE 10708, arXiv:1808.06648.
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