List of Publications – Mathew Madhavacheril

h-index: 41 6630+ citations

A full publication list is available online at my Google Scholar profile.

Last updated: April 16, 2023

Legend:

(i) indicates that I supervised or co-supervised the corresponding student-led publication.

✓ indicates that it has been accepted in a journal after peer-review.

indicates that it is intended for peer-review but has not been accepted yet.

Out of 95 articles, 79 have been submitted for peer-review and 68 have been accepted.

Papers with major contributions

- 1. III The Atacama Cosmology Telescope: A Measurement of the DR6 CMB Lensing Power Spectrum and its Implications for Structure Growth
 - F. J. Qu, B. D. Sherwin, **MS Madhavacheril**, D. Han, K. T. Crowley et al ACT, 04/2023, arxiv:2304.05202, submitted to ApJ
- 2. The Atacama Cosmology Telescope: Mitigating the impact of extragalactic foregrounds for the DR6 CMB lensing analysis
 - N. MacCrann, B. D. Sherwin, F. J. Qu, T. Namikawa, MS Madhavacheril, 04/2023, arxiv:2304.05196, submitted to ApJ
- 3. The Atacama Cosmology Telescope: DR6 Gravitational Lensing Map and Cosmological Parameters
 - MS Madhavacheril, F. J. Qu, B. D. Sherwin, N. MacCrann, Y. Li et al ACT, 04/2023, arxiv:2304.05203, submitted to ApJ
- High-accuracy emulators for observables in LCDM and extended cosmologies
 B. Bolliet, A. Spurio Mancini, J. Hill, MS Madhavacheril et al, 03/2023, arxiv:2303.01591, submitted to MNRAS
- The Atacama Cosmology Telescope: Map-Based Noise Simulations for DR6
 Atkins et al ACT (incl. MS Madhavacheril), 03/2023, arxiv:2303.04180, submitted to JCAP
- 6. Constraints on primordial non-Gaussianity from halo bias measured through CMB lensing cross-correlations
 - F. McCarthy, **MS Madhavacheril**, A. Maniyar, 10/2022, arxiv:2210.01049, submitted to PRD
- ✓ De-kSZing the cosmic microwave background with surveys of large-scale structure
 S. Foreman, S. Hotinli, MS Madhavacheril, A. van Engelen, C. Kreisch, 09/2022, arxiv:2209.03973, Phys. Rev. D 107, 083502

- Probing early structure and model-independent neutrino mass with high-redshift CMB lensing mass maps
 J. Qu, B. D. Sherwin, O. Darwish, T. Namikawa, MS Madhavacheril, 08/2022, arxiv:2208.04253, pre-print
- 9. **(†)** ✓ The Bias to Cosmic Microwave Background Lensing Reconstruction from the Kinematic Sunyaev-Zel'dovich Effect at Reionization H. Cai, MS Madhavacheril, J. C. Hill, A. Kosowsky, 11/2021, arxiv:2111.01944, *Phys. Rev. D* 105, 043516
- 10. **(†)** ✓ Simulated catalogs and maps of radio galaxies at millimeter wavelengths in Websky Z. Li, G. Puglisi, **MS Madhavacheril**, M. Alvarez, 10/2021, arxiv:2110.15357, JCAP 08 (2022) 029
- ✓ Cosmology with the moving lens effect
 C. Hotinli, K. M. Smith, MS Madhavacheril, M. Kamionkowski, 08/2021, arxiv:2108.02207, Phys. Rev. D 104, 083529
- ✓ A high-resolution view of the filament of gas between Abell 399 and Abell 401 from the Atacama Cosmology Telescope and MUSTANG-2
 A. Hincks, F. Radiconi, C. Romero, MS Madhavacheril et al. ACT and MUSTANG-2 collaborations, 07/2021, arxiv:2107.04611, MNRAS, Volume 510, Issue 3
- Combining information from multiple cosmological surveys: inference and modeling challenges
 Alonso et al (incl. MS Madhavacheril), 03/2021, arxiv:2103.05320, response to DOE/NASA RFI
- 15. **(i)** ✓ Baryonic feedback biases on fundamental physics from lensed CMB power spectra F. McCarthy, J. C. Hill, **MS Madhavacheril**, 03/2021, arxiv:2103.05582, Phys. Rev. D 105, 023517
- 16. ✓ The Atacama Cosmology Telescope: Summary of DR4 and DR5 Data Products and Data Access
 Mallaby-Kay et al (incl. MS Madhavacheril), 03/2021, arxiv:2103.03154, ApJS 255 11
- Quadratic estimators for CMB weak lensing
 A. Maniyar, Y. Ali-Haimoud, J. Carron, A. Lewis, MS Madhavacheril, 01/2021, arxiv:2101.12193,
 Phys. Rev. D 103, 083524 (2021)
- 18. **(†)** ✓ Improving models of the cosmic infrared background using CMB lensing mass maps F. McCarthy, **MS Madhavacheril**, 11/2020, arxiv:2010.16405, Phys. Rev. D 103, 103515 (2021)
- ✓ CMB lensing power spectrum estimation without instrument noise bias
 MS Madhavacheril, K. Smith, B. Sherwin, S. Naess, 11/2020, arxiv:2011.02475, JCAP, Volume 2021, 028

- 20. ✓ The Atacama Cosmology Telescope: Weighing distant clusters with the most ancient light MS Madhavacheril, C. Sifon, N. Battaglia et al. ACT collaboration, 09/2020, arxiv:2009.07772, ApJ Letters, 903, 1
- 21. ✓ The Atacama Cosmology Telescope: A Catalog of more than 4000 Sunyaev-Zel'dovich Galaxy Clusters
 M. Hilton, C. Sifón, S. Naess, MS Madhavacheril et al. ACT, DES, HSC, KiDS collaborations, 09/2020, arxiv:2009.11043. ApJS 253 3
- 22. ✓ The Atacama Cosmology Telescope: Delensed Power Spectra and Parameters D. Han, N. Sehgal, A. MacInnis, A. van Engelen, B. D. Sherwin, MS Madhavacheril et al. ACT collaboration, 07/2020, arxiv:2007.14405, JCAP, Issue 01, article id. 031 (2021)
- 23. ✓ The Atacama Cosmology Telescope: A Measurement of the Cosmic Microwave Background Power Spectra at 98 and 150 GHz
 S. Choi et al. ACT collaboration (incl. MS Madhavacheril), 07/2020, arxiv:2007.07289, JCAP12(2020)045
- 24. ✓ The Atacama Cosmology Telescope: DR4 Maps and Cosmological Parameters S. Aiola et al. ACT collaboration (incl. MS Madhavacheril), 07/2020, arxiv:2007.07288, JCAP12(2020)047
- 25. The Atacama Cosmology Telescope: A CMB lensing mass map over 2100 square degrees of sky and its cross-correlation with BOSS-CMASS galaxies
 O. Darwish, MS Madhavacheril, B. Sherwin et al. ACT collaboration, 04/2020, arxiv:2004.01139, MNRAS, Volume 500, Issue 2
- 26. ✓ The Atacama Cosmology Telescope: Component-separated maps of CMB temperature and the thermal Sunyaev-Zel'dovich effect
 MS Madhavacheril, J. C. Hill, S. Naess et al. ACT Collaboration, 11/2019, arxiv:1911.05717, Physical Review D 102 (2), 023534

- 29. ✓ Constraining neutrino mass with the tomographic weak lensing one-point probability distribution function and power spectrum

 J Liu, MS Madhavacheril, 04/2019, arxiv:1809.10747, Physical Review D 99 (8), 083508
- 31. ✓ The Simons Observatory: science goals and forecasts
 Ade et al. Simons Observatory Collaboration (incl. MS Madhavacheril), 02/2019, arxiv:1808.07445,

 Journal of Cosmology and Astroparticle Physics 2019 (02), 056

- 32. **(f)** ✓ Measuring the small-scale matter power spectrum with high-resolution CMB lensing HN Nguyen, N Sehgal, **MS Madhavacheril**, 01/2019, arxiv:1710.03747, Physical Review D 99 (2), 023502
- 33. ✓ Cosmology with kSZ: breaking the optical depth degeneracy with Fast Radio Bursts MS Madhavacheril, N Battaglia, KM Smith, JL Sievers, 01/2019, arxiv:1901.02418, Physical Review D 100 (10), 103532
- 35. KSZ tomography and the bispectrum KM Smith, MS Madhavacheril, M Münchmeyer, S Ferraro, U Giri, MC Johnson, 10/2018, arxiv:1810.13423, in review by Physical Review D
- 36. ✓ Constraining local non-Gaussianities with kSZ tomography M Münchmeyer, MS Madhavacheril, S Ferraro, MC Johnson, KM Smith, 10/2018, arxiv:1810.13424, Physical Review D 100, 083508
- 37. ✓ Mitigating foreground biases in CMB lensing reconstruction using cleaned gradients MS Madhavacheril, JC Hill, 07/2018, arxiv:1802.08230, Physical Review D 98 (2), 023534
- 38. The weight of cosmic lenses (invited News and Views article; not peer-reviewed) MS Madhavacheril, 11/2017, Nature Astronomy 1 (11), 751-752
- ✓ Fundamental physics from future weak-lensing calibrated Sunyaev-Zel'dovich galaxy cluster counts
 MS Madhavacheril, N Battaglia, H Miyatake, 11/2017, arxiv:1708.07502, Physical Review D 96 (10), 103525
- 40. ✓ Two-season Atacama Cosmology Telescope polarimeter lensing power spectrum BD Sherwin, A Van Engelen, N Sehgal, MS Madhavacheril et al. ACTPol Collaboration, 06/2017, arxiv:1611.09753, Physical Review D 95 (12), 123529
- 41. ✓ Internal delensing of cosmic microwave background acoustic peaks N Sehgal, MS Madhavacheril, B Sherwin, A van Engelen, 05/2017, arxiv:1612.03898, Physical Review D (10), 103512
- 42. ✓ Measurement of a cosmographic distance ratio with galaxy and cosmic microwave background lensing
 H Miyatake, MS Madhavacheril, N Sehgal, A Slosar, DN Spergel, B Sherwin, A van Engelen, 04/2017, arxiv:1605.05337, Physical Review Letters 118 (16), 161301
- 43. CMB-S4 science book Abazajian et al. CMB-S4 collaboration (incl. **MS Madhavacheril**), 10/2016, arxiv:1610.02743, unsubmitted (for arXiv only)
- 44. ✓ The Atacama Cosmology Telescope: Evidence of lensing of the cosmic microwave background by dark matter halos
 MS Madhavacheril, N Sehgal et al. ACTPol Collaboration, 04/2015, arxiv:1411.7999, Physical Review Letters 114 (15), 151302

- 45. We Building unbiased estimators from non-Gaussian likelihoods with application to shear estimation
 - MS Madhavacheril, P McDonald, N Sehgal, A Slosar, 01/2015, arxiv:1407.1906, Journal of Cosmology and Astroparticle Physics 2015 (01), 022
- 46. ✓ Current dark matter annihilation constraints from CMB and low-redshift data MS Madhavacheril, N Sehgal, TR Slatyer, 05/2014, arxiv:1310.3815, Physical Review D 89 (10), 103508

Papers with some contribution

- 47. The Atacama Cosmology Telescope: Flux Upper Limits from a Targeted Search for Extragalactic Transients
 Hervias-Caimapo et al ACT (incl. MS Madhavacheril), 01/2023, arxiv:2301.07651, submitted to MNRAS
- 48. ✓ The Atacama Cosmology Telescope: limits on dark matter-baryon interactions from DR4 power spectra
 Z. Li et al ACT collaboration (incl. MS Madhavacheril), 08/2022, arxiv:2208.08985, JCAP02(2023)046
- 49. The Atacama Cosmology Telescope: The Persistence of Neutrino Self-Interaction in Cosmological Measurements
 C. D. Kreisch et al ACT collaboration (incl. MS Madhavacheril), 07/2022, arxiv:2207.03164, pre-print
- 50. Snowmass 2021 CMB-HD White Paper Aiola et al. CMB-HD collaboration (incl. MS Madhavacheril), 03/2022, arxiv:2203.05728, Contribution to Snowmass 2021
- 51. Snowmass 2021 CMB-S4 White Paper Abazajian et al. CMB-S4 collaboration (incl. **MS Madhavacheril**), 03/2022, arxiv:2203.08024, Contribution to Snowmass 2021
- 52. The Simons Observatory: a new open-source power spectrum pipeline applied to the Planck legacy data
 Z. Li et al Simons Observatory collaboration (incl. MS Madhavacheril), 12/2021, arxiv:2112.13839, pre-print
- 53. ✓ The Atacama Cosmology Telescope: Measurement and Analysis of 1D Beams for DR4 M. Lungu et al ACT collaboration (incl. MS Madhavacheril), 12/2021, arxiv:2112.12226, JCAP 05 (2022) 044
- 54. ✓ The Simons Observatory: Constraining inflationary gravitational waves with multi-tracer B-mode delensing
 T. Namikawa et al SO collaboration (incl. MS Madhavacheril), 10/2021, arxiv:2110.09730, Phys. Rev. D 105, 023511
- 55. ✓ The Atacama Cosmology Telescope: Constraints on Pre-Recombination Early Dark Energy J. C. Hill, E. Calabrese et al ACT collaboration (incl. MS Madhavacheril), 09/2021, arxiv:2109.04451, Phys. Rev. D 105, 123536

- 56. ✓ Cross-correlation of DES Y3 lensing and ACT/Planck thermal Sunyaev Zel'dovich Effect I: Measurements, systematics tests, and feedback model constraints M. Gatti et al ACT and DES collaborations (including MS Madhavacheril), 08/2021, arxiv:2108.01600, Phys. Rev. D 105, 123525
- 57. ✓ Cross-correlation of DES Y3 lensing and ACT/Planck thermal Sunyaev Zel'dovich Effect II: Modeling and constraints on halo pressure profiles
 S. Pandey et al ACT and DES collaborations (including MS Madhavacheril), 08/2021, arxiv:2108.01601, Phys. Rev. D 105, 123526
- 58. ✓ The Atacama Cosmology Telescope: Microwave Intensity and Polarization Maps of the Galactic Center
 Y. Guan et al. ACT collaboration (including MS Madhavacheril), 05/2021, arxiv:2105.05267, ApJ 920 6
- 59. ✓ The mass and galaxy distribution around SZ-selected clusters
 T. Shin et al. ACT collaboration (incl. MS Madhavacheril), 05/2021, arxiv:2105.05914,
 MNRAS, Volume 507, Issue 4
- 60. ✓ The Atacama Cosmology Telescope: A search for Planet 9
 S. Naess et al. ACT collaboration (incl. MS Madhavacheril), 04/2021, arxiv:2104.10264, ApJ 923 224
- 61. ✓ The Atacama Cosmology Telescope: Probing the Baryon Content of SDSS DR15 Galaxies with the Thermal and Kinematic Sunyaev-Zel'dovich Effects

 E. Vavagiakis et al. ACT collaboration, 01/2021, arxiv:2101.08373, Phys. Rev. D 104, 043503 (2021)
- 62. ✓ The Atacama Cosmology Telescope: Detection of the Pairwise Kinematic Sunyaev-Zel'dovich Effect with SDSS DR15 Galaxies
 V. Calafut et al. ACT collaboration, 01/2021, arxiv:2101.08374, Phys. Rev. D 104, 043502 (2021)
- 63. ✓ The Atacama Cosmology Telescope: Detection of mm-wave transient sources S. Naess et al. ACT collaboration (incl. MS Madhavacheril), 12/2020, arxiv:2012.14347, ApJ 915 14
- 64. NDRIO White Paper: Envisioning Digital Research Infrastructure for the Simons Observatory A. Hincks et al. (incl. MS Madhavacheril), 12/2020, arxiv:2012.12205, NDRIO white paper
- 65. ✓ The Simons Observatory: Bandpass and polarization-angle calibration requirements for B-mode searches
 M. Abitbol et al Simons Observatory collaboration, 11/2020, arxiv:2011.02449, JCAP05(2021)032
- 66. ✓ Strong detection of the CMB lensing x galaxy weak lensing cross-correlation from ACT-DR4, Planck Legacy and KiDS-1000
 N. Robertson et al. ACT collaboration, 11/2020, arxiv:2011.11613, A&A 649, A146 (2021)
- 67. ✓ The Atacama Cosmology Telescope: Combined kinematic and thermal Sunyaev-Zel'dovich measurements from BOSS CMASS and LOWZ halos

 E. Schaan et al. ACT collaboration, 09/2020, arxiv:2009.05557, Phys. Rev. D 103, 063513 (2021)

- 68. ✓ The Atacama Cosmology Telescope: Modelling the Gas Thermodynamics in BOSS CMASS galaxies from Kinematic and Thermal Sunyaev-Zel'dovich Measurements S. Amodeo et al. ACT collaboration, 09/2020, arxiv:2009.05558, Phys. Rev. D 103, 063514 (2021)
- 69. ✓ CMB-S4: Forecasting Constraints on Primordial Gravitational Waves CMB-S4 collaboration, 08/2020, arxiv:2008.12619, ApJ 926 54
- 70. Probing galaxy evolution in massive clusters using ACT and DES: splashback as a cosmic clock
 - S. Adhikari et al. ACT, DES collaborations, 08/2020, arxiv:2008.11663, ApJ 923 37
- 71. The Atacama Cosmology Telescope: Arcminute-resolution maps of 18,000 square degrees of the microwave sky from ACT 2008-2018 data combined with Planck
 - S. Naess et al. ACT collaboration, 07/2020, arxiv:2007.07290, JCAP12(2020)046
- 72. ✓ The cross correlation of the ABS and ACT maps

 Z. Li et al. ACT collaboration, 02/2020, arxiv:2002.05717, Journal of Cosmology and Astroparticle Physics 09(2020)010
- ✓ Constraints on Cosmic Birefringence
 T. Namikawa et al. ACT collaboration, 01/2020, arxiv:2001.10465, Physical Review D 101 (8), 083527
- 74. Astro2020 APC White Paper, Project: The Simons Observatory
 Abitbol et al. Simons Observatory collaboration, 09/2019, arxiv:1907.08284, Bulletin of the
 American Astronomical Society
- 75. A Space Mission to Map the Entire Observable Universe using the CMB as a Backlight Basu et al., 09/2019, arxiv:1909.01592, Science White Paper submitted in response to the ESA Voyage 2050 call
- 76. Microwave Spectro-Polarimetry of Matter and Radiation across Space and Time Delabrouille et al., 09/2019, arxiv:1909.01591, Science White Paper submitted in response to the ESA Voyage 2050 call
- 77. CMB-S4 Science Case, Reference Design, and Project Plan Abazajian et al. CMB-S4 collaboration, 07/2019, arxiv:1907.04473, submitted as a Decadal Survey Report
- 78. CMB-HD: An Ultra-Deep, High-Resolution Millimeter-Wave Survey Over Half the Sky N Sehgal et al. CMB-HD collaboration, 06/2019, arxiv:1906.10134, submitted to Astro2020 Decadal Survey
- 79. ✓ Measurement of the splashback feature around SZ-selected Galaxy clusters with DES, SPT, and ACT
 T Shin et al. DES, SPT and ACT collaborations, 05/2019, arxiv:1811.06081, Monthly Notices of the Royal Astronomical Society 487 (2), 2900-2918
- 80. ✓ Weak-lensing Mass Calibration of ACTPol Sunyaev–Zel'dovich Clusters with the Hyper Suprime-Cam Survey H Miyatake et al. ACTPol and HSC collaborations, 04/2019, arxiv:1804.05873, The Astrophysical Journal 875 (1), 63

- 81. Messengers from the Early Universe: Cosmic Neutrinos and Other Light Relics D Green et al., 03/2019, arxiv:1903.04763, submitted to Astro2020 Decadal Survey
- 82. Science from an Ultra-Deep, High-Resolution Millimeter-Wave Survey N Sehgal et al., 03/2019, arxiv:1903.03263, submitted to Astro2020 Decadal Survey
- 83. Probing Feedback in Galaxy Formation with Millimeter-wave Observations N Battaglia et al., 03/2019, arxiv:1903.04647, submitted to Astro2020 Decadal Survey
- 84. Cosmological Probes of Dark Matter Interactions: The Next Decade V Gluscevic et al., 03/2019, arxiv:1903.05140, submitted to Astro2020 Decadal Survey
- 85. PICO: Probe of Inflation and Cosmic Origins S Hanany et al., 02/2019, arxiv:1902.10541, submitted to Astro2020 Decadal Survey
- 86. ✓ The Atacama Cosmology Telescope: Non-Gaussianity of secondary anisotropies from ACT-Pol and Planck
 WR Coulton et al. ACTPol Collaboration, 09/2018, arxiv:1711.07879, Journal of Cosmology
 and Astroparticle Physics 2018 (09), 022
- 87. ✓ The Atacama Cosmology Telescope: the two-season ACTPol Sunyaev–Zel'dovich effect selected cluster catalog
 M Hilton et al. ACTPol Collaboration, 03/2018, arxiv:1709.05600, The Astrophysical Journal Supplement Series 235 (1), 20
- 88. ✓ MassiveNuS: cosmological massive neutrino simulations
 J Liu, S Bird, JMZ Matilla, JC Hill, Z Haiman, MS Madhavacheril, A Petri, DN Spergel,
 03/2018, arxiv:1711.10524, Journal of Cosmology and Astroparticle Physics 2018 (03), 049
- 89. ✓ Two-season ACTPol spectra and parameters
 T Louis et al. ACTPol Collaboration, 06/2017, arxiv:1610.02360, Journal of Cosmology and
 Astroparticle Physics 2017 (06), 031
- 90. ✓ Detection of the pairwise kinematic Sunyaev-Zel'dovich effect with BOSS DR11 and the Atacama Cosmology Telescope
 F De Bernardis et al. ACTPol Collaboration, 03/2017, arxiv:1607.02139, Journal of Cosmology and Astroparticle Physics 2017 (03), 008
- 91. ✓ Survey strategy optimization for the Atacama Cosmology Telescope
 F De Bernardis et al. ACTPol Collaboration, 07/2016, arxiv:1607.02120, Observatory Operations: Strategies, Processes, and Systems VI 9910, 991014
- 92. ✓ The Atacama Cosmology Telescope: Evidence for the kinematic Sunyaev-Zel'dovich effect with the Atacama Cosmology Telescope and velocity reconstruction from the Baryon Oscillation Spectroscopic Survey

 E. Schaan et al. ACTPol Collaboration, 04/2016, arxiv:1510.06442, Physical Review D 93 (8), 082002
- 93. ✓ The Atacama Cosmology Telescope: Lensing of CMB temperature and polarization derived from cosmic infrared background cross-correlation

 A. van Engelen et al. ACTPol collaboration, 07/2015, arxiv:1412.06260, The Astrophysical Journal 808 (1), 7

- 94. The Atacama Cosmology Telescope: Measuring radio galaxy bias through cross-correlation with lensing
 - R Allison et al. ACTPol Collaboration, 05/2015, arxiv:1502.06456, Monthly Notices of the Royal Astronomical Society 451 (1), 849-858
- 95. \checkmark CMB polarization at $200 < \ell < 9000$ S Naess et al. ACTPol Collaboration, 10/2014, arxiv:1405.5524, Journal of Cosmology and Astroparticle Physics 2014 (10), 007