

List of Publications – Mathew Madhavacheril

h-index: 39

6300+ citations

A full publication list is available online at my [Google Scholar](#) profile.

Legend:

① 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 92 articles, 75 have been submitted for peer-review and 66 have been accepted.

Papers with major contributions



1. ■ High-accuracy emulators for observables in Λ CDM and extended cosmologies
B. Bolliet, A. Spurio Mancini, J. Hill, **MS Madhavacheril** et al, 03/2023, [arxiv:2303.01591](#), *pre-print*
2. ■ 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*
3. ■ 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](#), *submitted to PRD*
4. ① ■ Probing early structure and model-independent neutrino mass with high-redshift CMB lensing mass maps
F. J. Qu, B. D. Sherwin, O. Darwish, T. Namikawa, **MS Madhavacheril**, 08/2022, [arxiv:2208.04253](#), *pre-print*
5. ① ✓ 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*
6. ① ✓ 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*
7. ✓ Cosmology with the moving lens effect
S. C. Hotinli, K. M. Smith, **MS Madhavacheril**, M. Kamionkowski, 08/2021, [arxiv:2108.02207](#), *Phys. Rev. D 104, 083529*

8.   Superclustering with the Atacama Cosmology Telescope and Dark Energy Survey: I. Evidence for thermal energy anisotropy using oriented stacking
M. Lokken, R. Hlozek, A. van Engelen, **MS Madhavacheril** et al. ACT and DES collaborations, 07/2021, [arxiv:2107.05523](#), *ApJ* 933 134
9.  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
10.  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
11. Combining information from multiple cosmological surveys: inference and modeling challenges
D. Alonso et al (incl. **MS Madhavacheril**), 03/2021, [arxiv:2103.05320](#), *response to DOE/NASA RFI*
12.   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
13.  Quadratic estimators for CMB weak lensing
A. Maniyar, Y. Ali-Haïmoud, J. Carron, A. Lewis, **MS Madhavacheril**, 01/2021, [arxiv:2101.12193](#), *Phys. Rev. D* 103, 083524 (2021)
14.   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)
15.  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
16.  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
17.  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
18.  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)
19.  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](#), *JCAP*12(2020)045
20.  DR4 Maps and Cosmological Parameters
S. Aiola et al. ACT collaboration (incl. **MS Madhavacheril**), 07/2020, [arxiv:2007.07288](#), *JCAP*12(2020)047













21.   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
22.  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
23.   Improving Small-Scale CMB Lensing Reconstruction
B Hadzhiyska, BD Sherwin, **MS Madhavacheril**, S Ferraro, 05/2019, [arxiv:1905.04217](#), *Physical Review D* 100 (2), 023547
24.   Constraining neutrino mass with the tomographic weak lensing bispectrum
WR Coulton, J Liu, **MS Madhavacheril**, V Böhm, DN Spergel, 05/2019, [arxiv:1810.02374](#), *Journal of Cosmology and Astroparticle Physics* 2019 (05), 043
25.  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
26.   Improving Constraints on Fundamental Physics Parameters with the Clustering of Sunyaev-Zeldovich Selected Galaxy Clusters
D Cromer, N Battaglia, **MS Madhavacheril**, 03/2019, [arxiv:1903.00976](#), *Physical Review D* 100 (6), 063529
27.  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
28.  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
29.   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
30.   Disentangling dark physics with cosmic microwave background experiments
Z Li, V Gluscevic, KK Boddy, **MS Madhavacheril**, 12/2018, [arxiv:1806.10165](#), *Physical Review D* (12), 123524
31.  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
32.  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*
33.  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

34.  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
35. The weight of cosmic lenses (invited News and Views article; not peer-reviewed)
MS Madhavacheril, 11/2017, *Nature Astronomy* 1 (11), 751-752
36.  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
37.  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
38.  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
39. CMB-S4 science book
 Abazajian et al. CMB-S4 collaboration (incl. **MS Madhavacheril**), 10/2016, [arxiv:1610.02743](#), *unsubmitted (for arXiv only)*
40.  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
41.  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
42.  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

43.  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*
44.  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](#), *preprint*

45. ■■ 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*
46. Snowmass 2021 CMB-HD White Paper
Aiola et al. CMB-HD collaboration (incl. **MS Madhavacheril**), 03/2022, [arxiv:2203.05728](#), *Contribution to Snowmass 2021*
47. Snowmass 2021 CMB-S4 White Paper
Abazajian et al. CMB-S4 collaboration (incl. **MS Madhavacheril**), 03/2022, [arxiv:2203.08024](#), *Contribution to Snowmass 2021*
48. ■■ 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*
49. ✓ 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*
50. ✓ 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*
51. ✓ 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*
52. ✓ 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*
53. ✓ 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*
54. ✓ 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*
55. ✓ 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*
56. ✓ 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*

57.  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)
58.  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)
59.  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
60. 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*
61.  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](#), *JCAP*05(2021)032
62.  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)
63.  Combined kinematic and thermal Sunyaev-Zel'dovich measurements from BOSS CMASS and LOWZ halos
E. Schaen et al. ACT collaboration, 09/2020, [arxiv:2009.05557](#), *Phys. Rev. D* 103, 063513 (2021)
64.  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)
65.  CMB-S4: Forecasting Constraints on Primordial Gravitational Waves
CMB-S4 collaboration, 08/2020, [arxiv:2008.12619](#), *ApJ* 926 54
66.  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
67.  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](#), *JCAP*12(2020)046
68.  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
69.  Constraints on Cosmic Birefringence
T. Namikawa et al. ACT collaboration, 01/2020, [arxiv:2001.10465](#), *Physical Review D* 101 (8), 083527

70. 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*
71. 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*
72. 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*
73. 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*
74. 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*
75.  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
76.  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
77. 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*
78. Science from an Ultra-Deep, High-Resolution Millimeter-Wave Survey
N Sehgal et al., 03/2019, [arxiv:1903.03263](#), *submitted to Astro2020 Decadal Survey*
79. Probing Feedback in Galaxy Formation with Millimeter-wave Observations
N Battaglia et al., 03/2019, [arxiv:1903.04647](#), *submitted to Astro2020 Decadal Survey*
80. Cosmological Probes of Dark Matter Interactions: The Next Decade
V Gluscevic et al., 03/2019, [arxiv:1903.05140](#), *submitted to Astro2020 Decadal Survey*
81. PICO: Probe of Inflation and Cosmic Origins
S Hanany et al., 02/2019, [arxiv:1902.10541](#), *submitted to Astro2020 Decadal Survey*
82.  Non-Gaussianity of secondary anisotropies from ACTPol and Planck
WR Coulton et al. ACTPol Collaboration, 09/2018, [arxiv:1711.07879](#), *Journal of Cosmology and Astroparticle Physics* 2018 (09), 022
83.  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

- 84.  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
- 85.  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
- 86.  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 Cosmol-
ogy and Astroparticle Physics* 2017 (03), 008
- 87.  Survey strategy optimization for the Atacama Cosmology Telescope
F De Bernardis et al. ACTPol Collaboration, 07/2016, [arxiv:1607.02120](#), *Observatory Oper-
ations: Strategies, Processes, and Systems VI* 9910, 991014
- 88.  Evidence for the kinematic Sunyaev-Zel'dovich effect with the Atacama Cosmology Tele-
scope 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
- 89.  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
- 90.  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
- 91.  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