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# Meir Shimon

## Curriculum Vitae

### Personal Details

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### Education

#### Undergraduate and Graduate Studies

- PhD: 1998-2005, Tel-Aviv University, Physics, advised by Yoel Rephaeli, “Physical Processes in Clusters of Galaxies”
- MSc: 1994-1998, Tel-Aviv University, Physics, advised by Larry P. Horwitz, “Aspects of 2+1 Dimensional Gravity”
- BSc: 1991-1994, Tel-Aviv University, Physics

#### Post-Doctoral Studies

- PhD: 2005-2010, UC San Diego, CASS, mentored by Brian Keating

### Awards, Citations, Honors, Fellowships

- Inaugural CASS Director’s Postdoctoral Fellow, 2008-2009
- The Dan David PhD Scholarship Prize, 2003

### Employment

- 2010-present: Researcher, Tel-Aviv University
- 2005-2010: CASS Postdoctoral Fellow, UC San Diego

- 2004-2005: Teaching assistant, Tel-Aviv University
- 1995-2003: Teaching assistant, Tel-Aviv University

## Membership in Past and Present CMB Projects

- Simons Observatory <sup>1</sup>
- POLARBEAR <sup>2</sup>
- EPIC <sup>3</sup>
- CMBPol <sup>4</sup>

## Refereed articles and refereed letters in scientific journals

1. Shimon, M. 2026, *Locally Scale-Invariant Gravity with Conserved Global Charges*, Symmetry, **18(7)**, 1178
2. Shimon, M. 2026, *Rapidity Asymmetry in Cosmology and the Observable Cosmological Arrow*, Universe, **12(6)**, 182
3. Abitbol, M., Abril-Cabezas, I., Adachi, S., et al. 2026, ‘*The Simons Observatory: forecasted constraints on primordial gravitational waves with the expanded array of Small Aperture Telescopes*’, JCAP, **2026**, 4, 051
4. Shimon, M. 2026, *A Small Patch Hypothesis in Cosmology*, Astronomy, **5(1)**, 4
5. Shimon, M. 2025, *Disentangling the Cosmic/Comoving Duality: The Cognitive Stability and Typicality Tests*, Astronomy, **4(4)**, 25
6. Shimon, M. 2025, *Cosmology at the End of Time*, Universe, **11(10)**, 346
7. Abitbol, M., Abril-Cabezas, I., Adachi, S., et al. 2025, ‘*The Simons Observatory: science goals and forecasts for the enhanced Large Aperture Telescope*’, JCAP, **2025**, 8, 034
8. Shimon, M. 2025, *Extensive and Intensive Aspects of Astrophysical Systems and Fine-Tuning*, Universe, **11(8)**, 269

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<sup>1</sup><https://simonsobservatory.org/>

<sup>2</sup><http://bolo.berkeley.edu/polarbear>

<sup>3</sup><http://arxiv.org/abs/0906.1188>

<sup>4</sup><http://cmbpol.uchicago.edu/>

9. Shimon, M. & Rephaeli, Y. 2025, *Differing Manifestations of Spatial Curvature in Cosmological FRW Models*, Universe, **11(5)**, 143
10. Shimon, M. 2025, *'Bounce Cosmology in a Locally Scale Invariant Physics with a  $U(1)$  Symmetry'*, Universe, **11(3)**, 93
11. Ben-Dayana, I., Kumar, U., Shimon, M., Verma, A. 2025, *'Impact of low  $\ell$ 's on large scale structure anomalies'*, JCAP, **2025**, 2, 69
12. Shimon, M., 2024, *'Elucidation of 'Cosmic Coincidence''*, New Astronomy, **106**, 102126
13. Shimon, M., 2022, *'Possible Resolution of the Hubble Tension with Weyl Invariant Gravity'*, JCAP, **2022**, 048
14. Shimon, M. 2021, *'Weyl-Invariant Gravity and the Nature of Dark Matter'*, CQG, **38**, 085001
15. Shimon, M. & Rephaeli, Y. 2020, *'Parameter interplay of CMB temperature, space curvature, and expansion rate'*, PRD, **102**, 083532
16. Mirmelstein, M., Shimon, M., & Rephaeli, Y. 2020, *'Detection likelihood of cluster-induced CMB polarization'*, Astronomy & Astrophysics, **644**, A36
17. The Simons Observatory Collaboration, 2019, *'The Simons Observatory: Science goals and forecasts'*, JCAP, **1902**, 056
18. Pogossian, L., Shimon, M., Mewes, M., & Keating, B., 2019, *'Future CMB constraints on cosmic birefringence and implications for fundamental physics'*, PRD, **100**, 023507
19. POLARBEAR Collaboration, 2015, *'POLARBEAR Constraints on Cosmic Birefringence and Primordial Magnetic Fields'*, PRD, **92**, 123509
20. POLARBEAR Collaboration, 2014, *'A Measurement of the Cosmic Microwave Background B-Mode Polarization Power Spectrum at Sub-Degree Scales with POLARBEAR'*, ApJ, **794**, 171
21. POLARBEAR Collaboration, 2014, *'Measurement of the cosmic microwave background polarization lensing power spectrum with the POLARBEAR experiment'*, PRL, **113**, 021301

22. Kaufman, J. P., et al., 2014, '*Self-Calibration of BICEP1 Three-Year Data and Constraints on Astrophysical Polarization Rotation*', PRD, **89**, 062006
23. POLARBEAR Collaboration, 2014, '*Evidence for Gravitational Lensing of the Cosmic Microwave Background Polarization from Cross-correlation with the Cosmic Infrared Background*', PRL, **112**, 131302
24. Molnar, S., Broadhurst, T., Umetsu, K., Zitrin, A., Rephaeli, Y., & Shimon, M. 2013, '*Tangential Velocity of the Dark Matter in the Bullet Cluster from Precise Lensed Image Redshifts*', ApJ, **774**, 70
25. Shimon, M., Itzhaki, N., & Rephaeli, Y. 2013, '*Bias-Limited Extraction of Cosmological Parameters*', JCAP, **3**, 9
26. Keating, B. G., Shimon, M., & Yadav, A. P. S. 2013, '*Self-Calibration of CMB Polarization Experiments*', ApJL, **762**, L23
27. Shimon, M., Sadeh, S., & Rephaeli, Y. 2012, '*CMB Anisotropy Due to Filamentary Gas: Power Spectrum and Cosmological Parameter Bias*', JCAP, **10**, 38
28. Yadav, A. P. S., Shimon, M., & Keating, B. G. 2012, '*Revealing Cosmic Rotation*', PRD, **86**, 083002
29. Shimon, M., Rephaeli, Y., Itzhaki, N., Dvorkin, I., & Keating, B. G. 2012, '*Constraints on the Neutrino Mass from SZ Surveys*', MNRAS, **427**, 828
30. Dvorkin, I., Rephaeli, Y., & Shimon, M. 2012, '*Sunyaev-Zel'dovich power spectrum and cluster numbers from an extended merger-tree model*', MNRAS, **421**, 2648
31. Su, M., Yadav, A. P. S., Shimon, M., & Keating, B. G. 2011, '*Impact of Instrumental Systematics on the CMB Bispectrum*', PRD, **83**, 103007
32. Shimon, M., Sadeh, S., & Rephaeli, Y. 2011, '*Neutrino Mass Inference from SZ Surveys*', MNRAS, **412**, 1895
33. Miller, N. J., Shimon M., Kishimoto C. T., Smith C. J., Fuller G. M., Keating B. G., 2010, '*Using Big Bang Nucleosynthesis to extend CMB probes of neutrino physics*', JCAP, **5**, 37
34. Luzzi, G., Shimon, M., Lamagna, L., Rephaeli, Y., De Petris, M., Conte, A., De Gregori, S., & Battistelli, E. S. 2009, '*Redshift Dependence of the CMB Temperature from S-Z Measurements*', ApJ, **705**, 1122

35. Shimon, M., Rephaeli, Y., Sadeh, S., & Keating, B. 2009, '*Power Spectra of CMB Polarization by Scattering in Clusters*', MNRAS, **399**, 2088
36. Miller, N. J., Shimon, M., & Keating, B. G. 2009, '*CMB Polarization Systematics due to Beam Asymmetry: Impact on Cosmological Birefringence*', PRD, **79**, 103002
37. Miller, N. J., Shimon, M., & Keating, B. G. 2009, '*CMB Beam Systematics: Impact on Lensing Parameter Estimation*', PRD, **79**, 063008
38. Shimon, M., Keating, B., Ponthieu, N., & Hivon, E. 2008, '*CMB Polarization Systematics due To Beam Asymmetry: Impact on Inflationary Science*', PRD, **77**, 083003
39. Rephaeli, Y., Sadeh, S., & Shimon, M. 2006, '*Modeling Integrated Properties and the Polarization of the Sunyaev-Zeldovich Effect*', New Astronomy Review, **51**, 350
40. Shimon, M., Rephaeli, Y., O'Shea, B. W., & Norman, M. L. 2006, '*Cosmic Microwave Background Polarization due to Scattering in Clusters*', MNRAS, **368**, 511
41. Shimon, M. & Rephaeli, Y., 2004, '*Quantitative Description of the Sunyaev – Zeldovich Effect: Analytic Approximations*', New Astronomy, **9**, 69
42. Battistelli et al. 2003, '*Triple Experiment Spectrum of the Sunyaev-Zeldovich Effect in the Coma Cluster:  $H_0$* ', ApJ, **598**, L75
43. Battistelli et al. 2002, '*Cosmic Microwave Background Temperature at Galaxy Clusters*', ApJ, **580**, L101
44. Shimon, M. & Rephaeli, Y., 2002, '*Cosmic Microwave Background Comptonization by Energetic Nonthermal Electrons in Clusters of Galaxies*', ApJ, **575**, 12
45. Shimon, M., 1999, '*Generalized Law of Addition of Accelerations*', PRD, **59**, 067501

## **White Papers**

1. Chang et al., 2022, ‘*Snowmass2021 Cosmic Frontier: Cosmic Microwave Background Measurements White Paper*’, arXiv:2203.07638
2. The Simons Observatory Collaboration, 2019, ‘*The Simons Observatory: Astro2020 Decadal Project Whitepaper*’, Bull. Am. Astron. Soc. **51** (2019) 147
3. Bock, J., et al., 2009, ‘*Study of the Experimental Probe of Inflationary Cosmology (EPIC) – Intermediate Mission for NASA’s Einstein Inflation Probe*’, arXiv:0906.1188
4. Smith, K. M. et al., 2008, ‘*CMBPol Mission Concept Study: Gravitational Lensing*’, arXiv:0811.3916

## **Proceedings Papers**

1. Arnold, K., Ade, P. A. R., Anthony, A. E., et al. 2012, ‘*The bolometric focal plane array of the Polarbear CMB experiment*’, SPIE proceedings, 8452, arXiv:1210.7877
2. Kermish, Z. D., Ade, P., Anthony, A., et al. 2012, ‘*The POLARBEAR Experiment*’, SPIE proceedings, 8452, arXiv:1210.7768
3. Keating, B., Moyerman, S., Boettger, D., et al. 2011, ‘*Ultra High Energy Cosmology with POLARBEAR*’, DPF 2011 conference proceedings, arXiv:1110.2101
4. The Polarbear Collaboration, Errard, J., Ade, P. A. R., et al. 2010, ‘*The new generation CMB B-mode polarization experiment: POLARBEAR*’, 2010 Rencontres de Moriond proceedings, arXiv:1011.0763
5. Rephaeli, Y., Sadeh, S., & Shimon, M. 2005, ‘*The Sunyaev-Zeldovich Effect*’, Background Microwave Radiation and Intracluster Cosmology, 57
6. Battistelli, E. S. et al. 2003, ‘*Cosmic microwave background temperature evolution by Sunyaev – Zel’dovich effect observations*’, Memorie della Societa Astronomica Italiana, **74**, 316

## **Preprints and Non-Refereed Publications**

1. Shimon, M., 2026, ‘*Why Is a Day Longer Than a Second?*’, <https://zenodo.org/records/21419958>

## Selected Talks

1. *'Differing Manifestations of Spatial Curvature in Cosmological FRW Models'*, 2025, Technion
2. *'Cosmological Implications of Weyl-Invariant Gravity'*, 2021/2022, BIU, Ariel University
3. *'Weyl-Invariant Gravity and the Nature of Dark Matter'*, 2021 (Zoom) Weizmann Inst., BGU, HUJI, UCSD, TAU, BIU, & a 5 min talk in the 16th Patras Workshop
4. *'Conformal Higgs Gravity'*, 2018, TAU HEP seminar
5. *'Flat Spacetime Cosmology in a Scalar-Tensor Theory of Gravity'*, 2015, UCSD, Aspen Center for Physics
6. *'Bias-Limited Extraction of Cosmological Parameters'*, 2013, Weizmann Inst., Princeton, Johns Hopkins Uni.
7. *'Constraints on the Neutrino Mass from SZ Surveys'*, 2012, BGU, Technion
8. *'SZ Number Counts and Power Spectrum: Neutrino Mass Constraints and Bias of Cosmological Parameters'*, 2012, TAU
9. *'Forecasts for Neutrino Mass Constraints from SZ Surveys'*, 2011, HUJI, TAU, Technion
10. *'Constraining Neutrino Masses and Degeneracy Parameters with Future CMB Experiments'*, 2010, Arizona State Univ., UCSD, University of Arizona
11. *'CMB and Fundamental Physics'*, 2009, UC Berkeley, BGU, HUJI, UC Irvine, TAU, Weizmann Inst.
12. *'Cosmology with the SZ Effect'*, 2008, Enrico Fermi School, HUJI, Weizmann Inst.
13. *'In-depth Introduction to CMB Lensing'*, 2008, UCSD
14. *'CMB Polarization Systematics Due to Beam Asymmetry: Impact on Inflationary Science'*, 'Cosmic Cartography' Chicago Univ. (2007), Aspen Center for Physics (2008)