Julian B. Muñoz

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RESEARCH INTERESTS

I am a broadly trained theoretical astrophysicist working at the intersection of astronomy and particle physics. I am best known for my work on the first galaxies, 21-cm, and dark matter. I have developed models to probe the dark sector with data from cosmic dawn and reionization, and used them to search for dark matter within the HERA collaboration as well as JWST and HST observations. My work also uses the large-scale structure, the CMB, and fast radio bursts to understand the fundamental laws of our universe.

ACADEMIC POSITIONS

2023- **Assistant Professor,** Department of Astronomy, University of Texas at Austin, TX.
2020-23 **Clay Fellow,** Harvard-Smithsonian Center for Astrophysics, Cambridge, MA
2017-20 **Postdoctoral Fellow,** Department of Physics, Harvard University, Cambridge, MA.

EDUCATION

2017 **Ph.D. in Physics,** Johns Hopkins University, Baltimore, MD. "*New Cosmological Probes for Old Fundamental Questions*". Advisor: Marc Kamionkowski.

2013 **Graduado en Física** (Bachelor's in Physics), Complutense University of Madrid, Spain.

SELECTED PRESENTATIONS

Colloquia
"What is JWST teaching us about galaxies and cosmology?" NASA Goddard (2024), AAAS review, UCLA, JPL, UCSB (2025, schd.)
"Cosmic Dawn: The Next Frontier", MIT, Cornell, UT Astronomy, UT Physics, CITA, SLAC, Dartmouth, EuCAPT, Clay Lecture, McGill, UNC Chapel Hill, Weinberg memorial conference (2021-24).
"Cosmology with the 21-cm line", ETH Zurich, Yale Physics (2019-20).
"Did LIGO detect dark matter?" Harvard BHI (2017).

Invited Talks
"Cosmological puzzles from JWST" ASU, UPitt, YITP, Perimeter, JHU, UIUC, KITP, TeVPA, CCA-CFC, BU HEP (2024-)
"Understanding the First Galaxies" SALF VIII, 21cmGS, Berkeley, MPA, Fermilab, AliCPT (2022-23).
"Light Relics beyond $N_{\rm eff}$", GGI review, Aspen chalk talk (2021).
"Small scales and high-z with the 21-cm line", Seminar at Cornell, CERN, YITP, PSU, Perimeter, NYU, IFT, Weizmann, MIT, UT Austin, USC, BGU, Cambridge, Geneva, Stanford, Caltech, BSM Pandemic, Columbia, PCTS workshop, Structure Seminar, Berkeley BCTP, UNM, Minnesota (2020-22).

FUNDING

PI - NSF AAG "*Decoding the First Galaxies via 21-cm Fluctuations*" ~$500k (2024-)
PI - NSF AAG "*NSF-BSF: Dark Matter Interactions at Cosmic Dawn*" ~$450k (2023-)
CoI - **NSF** AI Center CosmicAI ~$20M (2024-29),
CoI - **NASA JWST GO** 06882, 07417, 07081, and **DD** 09223
Admin PI – **NASA HST-HF2-51561** (PI NHFP fellow: Jed McKinney)

AWARDS & HONORS

AAAS runner-up breakthrough of the year: invited reviewer of JWST studies of early light (2025).
Board of Visitors Excellence in Teaching Award; Rom Rhome Professional Development Award, UT (2024).
Named one of ScienceNews 10 scientists to watch (2023).
Clay Fellowship (2020), NASA Hubble NHFP and MIT Kavli (2020, declined).
Dan David Prize Scholar (2017).
EJ Rhee JHU travel award (2016), Pitt PACC travel award (2017).
Spanish Ministry of Education Fellowship (2012), summer IAC Fellowship (2012).

PROFESSIONAL SERVICE

Reviewing and Refereeing

NSF '21, 23, 24; NASA Postdoctoral '22, 23, 25; DoE HEP '24, ERC *Synergy*, and *FONDECYT*.
PRL, PRD, ApJ, ApJ Lett., JCAP, MNRAS, MNRAS Lett., Phys.Rept., Nature Astronomy & Nature Comm.

Professional Duties

Member, APS DAP executive committee (2025-)
Assistant Graduate Advisor, Astronomy Graduate Studies Executive Committee, UT Austin (2023-)
Organizer, Galaxies and Cosmology seminar UT Austin (2023-24), HEP seminar Harvard (2018-2019).
Committee member, UT faculty-search committee (2024, 2025), CFC postdoctoral fellowship (2024), UT Grad admissions (2023), TCCAP fellowship (2022-23), ITC postdoctoral fellowships (2021).
Contributor, CMB-S4 science book, thirteen Astro2020 and six Snowmass 2021 white papers.
Coordinator, dark matter group in HERA experiment and Glimpse JWST collaboration.
Developer, `Zeus21` (lead), `21cmFAST` (+`21cmvFAST`), `RelicFast`, and `GALLUMI`.

TEACHING & ADVISING

Students and Postdocs

Emily Bregou (graduate student at UT Austin), since 2024.
Owen Chase (graduate student at UT Austin), since 2023.
Yonny Sklansky (graduate student at UT Austin), since 2023.
Alessandra Venditti (postdoc at UT Austin), since 2024.
Mahdi Qezlou (postdoc at UT Austin), since 2024.
Emilie Thélie (postdoc at UT Austin), since 2023.
Wenzer Qin (graduate student at MIT -> Postdoc NYU), 2022-24.
Nash Sabti (graduate student at KCL->Postdoc JHU), 2019-24.
W. Linda Xu (graduate student at Harvard Physics->Postdoc Stanford), 2018-23.

Teaching

Introductory Astronomy, AST 307 at UT Austin, Spring 2025.
Undergraduate Cosmology, AST 376C at UT Austin, Fall 2023 and 2024.
Navigating Graduate School in Astronomy, Seminar for 1st years at UT Austin, Fall 2023 and 2024.
Guest Lecturer**,** Ay98 at Harvard Astronomy, Fall 2018 and 2019. Substitute Lecturer, Graduate Cosmology, Harvard Physics; Graduate Quantum, JHU.

Outreach and Community Activities

Founder and organizer, *Cafecito Cósmico*, Spanish-language astro journal club at UT Austin (2024-)
Science host, first DeepSkyTour in Spanish at the McDonald observatory (2024).
Demystifying the total eclipse, appearance on Fox7 Austin TV (2024).
Programs with Science for the Public, a Boston non-profit TV station in 2018 and 2024.
Panelist, 'Cosmology in Crisis' live+podcast, UT CNS public event (2023).
Mentor *Muse* program for underrepresented genders in STEM, UT Austin (2023-)
REU Advisor, Smithsonian Latino Initiative Program (2022) and UT Astro program (2024).
Contributor to Astronomy on Tap (Boston 2019, Austin 2025).

PUBLICATIONS

Total number of publications: 58 (including preprints: 82)
Total number of citations: >5000 (including preprints: >7500)
h-index: 39; citations/paper: 80 (including preprints: 88)

Selected

1. **J. B. Muñoz,** J. Mirocha, J. Chisholm, S.R. Furlanetto, and C. Mason
Reionization after JWST: a photon budget crisis?
MNRAS Lett. 535, 1, L37–L43 (2024). ArXiv: 2404.07250. – **Featured in** Science, Astronomy.com, Knowable Magazine, Phys.org, amongst others. (>50 citations)

2. **J. B. Muñoz**
Zeus21: An Effective Model for the Cosmic-Dawn 21-cm Signal
MNRAS 523 2, 2587 (2023). ArXiv: 2302.08506.

3. HERA collaboration (incl. **J. B. Muñoz**, I led the IGM and dark-matter constraints)
Constraints on the 21cm EoR Power Spectrum with HERA Phase I Observations
ApJ, 945, 124 (2023). ArXiv: 2210.04912. (>100 citations)

4. **J. B. Muñoz**
A Standard Ruler at Cosmic Dawn
Phys. Rev. Lett. 123, 131301 (2019). ArXiv: 1904.07868 – **Editor's Suggestion**, **featured in** APS, ScienceNews, and others. (>50 citations)

5. **J. B. Muñoz** and A. Loeb
A small amount of mini-charged dark matter could cool the baryons in the early Universe
Nature 557 no.7707, 684 (2018). ArXiv: 1802.10094. – **Featured in** Physics World, Cosmos Magazine, Live Science, and El País (ES) amongst others. (>300 citations)

Additional (* = Student/Postdoc supervised or mentored)

6. C. Cain*, A. D'Aloisio, and **J. B. Muñoz**
New constraints on the galactic ionizing efficiency and escape fraction based on QSO absorption spectra
Submitted. ArXiv: 2503.08778.

7. S. Fujimoto et al. (incl.. **J. B. Muñoz**)
GLIMPSE: An ultra-faint Pop III Galaxy Candidate and the Pop III UV Luminosity Function at $z \simeq 6-7$
Submitted. ArXiv: 2501.11678.

8. J. McKinney, O. Cooper, C M. Casey, **J. B. Munoz**, H Akins, E Lambrides, A S. Long
Modeling Galaxies in the Early Universe with Supernova Dust Attenuation
Submitted. ArXiv: 2502.14031.

9. H. Bae; A.L. Erickcek, S. Delos, and **J. B. Muñoz**
21-cm Constraints on Dark Matter Annihilation after an Early Matter-Dominated Era
Submitted. ArXiv:2502.08719

10. V. Kokorev, H. Atek, J. Chisholm, R. Endsley, I. Chemerynska, **J. B. Muñoz**, et al.
A Glimpse of the New Redshift Frontier Through Abell S1063
ApJ Lett (in press). ArXiv: 2411.13640.

11. G. Sun*, **J. B. Muñoz**, J. Mirocha, and C.A. Faucher-Giguère
Constraining bursty star formation histories with galaxy luminosity functions and clustering
JCAP (in press). ArXiv: 2410.21409.

12. DREAMS collaboration, T. Nguyen et al. (incl. **J. B. Muñoz**)
Emulating Satellite Galaxy and Subhalo Populations with Diffusion Models and Point Clouds
Submitted. ArXiv: 2409.02980

13. C. Cain*, G. Lopez, A. D'Aloisio, **J. B. Muñoz** et al.
Chasing the beginning of reionization in the JWST era
ApJ 980 83 (2025). ArXiv:2409.02989.

14. N. Sabti*, R. Reddy, **J. B. Muñoz**, S. Mishra-Sharm, and T. Youn
A Generative Modeling Approach to Reconstructing 21-cm Tomographic Data
*Machine Learning: Science and Technology, 6, 1. NeurIPS workshop ML4PS*24. ArXiv: 2407.21097.

15. H.A. Cruz*, **J. B. Muñoz**, N. Sabti, and M. Kamionkowski
The First Billion Years in Seconds: An Effective Model for the 21-cm Signal with PopIII Stars
PRD 111, 083503 (2025). ArXiv: 2407.18294.

16. C. Shallue*, **J. B. Muñoz**, and G. Krnjaic
Warm Hawking Relics from Primordial Black Hole Domination
JCAP 02 037 (2025). ArXiv: 2406.08535.

17. DREAMS collaboration, J. C. Rose et al. (incl. **J. B. Muñoz**)
Introducing the DREAMS Project: DM and Astrophysics with Machine learning and Simulations
Submitted. ArXiv: 2405.00766.

18. J. Verwohlt*, C. Mason, **J. B. Muñoz**, F-Y. Cyr-Racine, M. Vogelsberger, and J. Zavala
Separating Dark Acoustic Oscillations from Astrophysics at Cosmic Dawn
Phys.Rev.D 110 10, 103533 (2024). ArXiv: 2404.17640 - **Editor's Suggestion**, highlighted in APS**.**

19. Y. Sun*, J.W. Foster, H. Liu, **J. B. Muñoz**, and T. R. Slatyer
Inhomogeneous Energy Injection in the 21-cm Power Spectrum: Sensitivity to Dark Matter Decay
Phys.Rev.D 111 4, 043015 (2025). ArXiv: 2312.11608.

20. W. Qin*, **J. B. Muñoz**, H. Liu, and T. R. Slatyer
Birth of the first stars amidst decaying and annihilating dark matter
Phys.Rev.D 10, 103026 109 (2024). ArXiv: 2308.12992.

21. **J. B. Muñoz**, J. Mirocha, S. Furlanetto, and N. Sabti
Breaking degeneracies in the first galaxies with clustering
MNRAS Lett. 526 L47 (2023). ArXiv: 2306.09403.

22. N. Sabti*, **J. B. Muñoz**, and M. Kamionkowski
Insights from HST into Ultra-Massive Galaxies and Early-Universe Cosmology
Phys.Rev.Lett. 132 6, 061002 (2024). ArXiv: 2305.07049 – **Editor's Suggestion**, highlighted in APS, **featured in** KXAN, Scientific American, ScienceNews, Physics, Phys.org, and selected for the PRL 2024 collection (2% of all Letters published in 2024).

23. Y. Minghao et al. (incl. **J. B. Muñoz)**
Detecting and Characterizing Young Quasars: Gravitational Lensing Magnification
ApJ 950 105 (2023). ArXiv: 2304.09256.

24. C. Mason, **J. B. Muñoz**, B. Greig, A. Mesinger, J. Park
21cmfish: Fisher-matrix framework for fast parameter forecasts from the cosmic 21-cm signal
MNRAS 524 4711 (2023). ArXiv: 2212.09797.

25. X. Wu*, **J. B. Muñoz**, and D. J. Eisenstein
Non-parametric Lagrangian biasing from the insights of neural nets
JCAP 05 040 (2023). ArXiv: 2212.08095.

26. M. Montero^, **J. B. Muñoz**^, G. Obied^ **(^Alphabetical)**
Swampland bounds on dark sectors
JHEP 121 (2022). ArXiv: 2207.09448.

27. J. Mirocha, **J. B. Muñoz**, S. Furlanetto, A. Liu, and A. Mesinger
A galaxy-free phenomenological model for the 21-cm power spectrum during reionization
MNRAS 514 2, 2010 (2022). ArXiv: 2201.07249.

28. **J. B. Muñoz**, Y. Qin, A. Mesinger, S. Murray, B. Greig, and C. Mason
The Impact of the First Galaxies on Cosmic Dawn and Reionization
MNRAS 511 3, 3657 (2022). ArXiv: 2110.13919. (>90 citations)

29. N. Sabti*, **J. B. Muñoz**, and D. Blas
Measurements of the Clustering of Matter with the High-Redshift Galaxy UVLF
ApJ Letters 928 2, L20 (2022). ArXiv: 2110.13161 – **Featured in** AAS Nova.

30. N. Sabti*, **J. B. Muñoz**, and D. Blas
GALLUMI: A Galaxy Luminosity Function Pipeline for Cosmology and Astrophysics
Phys.Rev.D 105 4, 043518 (2022). ArXiv: 2110.13168.

31. X. Wu*, **J. B. Muñoz**, and D. J. Eisenstein
A fully Lagrangian, non-parametric bias model for dark-matter halos
JCAP 02 02, 002 (2022). ArXiv: 2109.13948.

32. HERA collaboration (incl. **J. B. Muñoz**, I led Secs. 4 and 7 on IGM and dark-matter constraints)
HERA Phase I Limits on the Cosmic 21-cm Signal: Constraints on Astrophysics and Cosmology During the Epoch of Reionization
ApJ 924, 51 (2021). ArXiv: 2108.07282. (>100 citations)

33. M. Rashkovetskyi*, **J. B. Muñoz**, D. J. Eisenstein, and C. Dvorkin
Small-scale Clumping at Recombination and the Hubble Tension
Phys.Rev.D 104 10, 103517 (2021). ArXiv: 2108.02747.

34. W.L. Xu*, **J. B. Muñoz**, and C. Dvorkin
Cosmological Constraints on Light (but Massive) Relics
Phys.Rev.D 105 9, 095029 (2022). ArXiv: 2107.09664.

35. S. Hotinli, T. Binnie, **J. B. Muñoz**, B. Dinda, and M. Kamionkowski
Probing compensated isocurvature with the 21-cm signal during cosmic dawn
Phys.Rev.D 104 6, 063536 (2021). ArXiv: 2106.11979.

36. A. Ray, R. Laha, **J. B. Muñoz**, and R. Caputo
Closing the gap: Near future MeV telescopes can discover asteroid-mass primordial black holes
Phys.Rev.D 104 2, 023516 (2021). ArXiv: 2102.06714. (>100 citations)

37. **J. B. Muñoz**, S. Bohr, F.Y. Cyr-Racine, J. Zavala, and Mark Vogelsberger
ETHOS: Impact of Dark Acoustic Oscillations on Cosmic Dawn
Phys.Rev.D 103 4, 043512 (2021). ArXiv: 2011.05333.

38. S. Murray, B. Greig, A. Mesinger, **J. B. Muñoz**, Y. Qin, J. Park, and C. Watkinson
21cmFASTv3: A Python-integrated C code for 3D realizations of the cosmic 21cm signal
JOSS 5(54), 2582. ArXiv: 2010.15121. (>75 citations)

39. N. Sabti*, **J. B. Muñoz**, and D. Blas
First Constraints on Small-Scale Non-Gaussianity from UV Galaxy Luminosity Functions
JCAP 01 010 (2021). ArXiv: 2009.01245.

40. J. Flitter, **J. B. Muñoz**, and E. Kovetz
Outliers in the LIGO Black Hole Mass Function from Coagulation in Dense Clusters
MNRAS 507 1, 743 (2020). ArXiv: 2008.10389

41. W.L. Xu*, N. Deporzio*, **J. B. Muñoz**, and C. Dvorkin
Accurately Weighing Neutrinos with Cosmological Surveys
Phys.Rev.D 103 2, 023503 (2021). ArXiv: 2006.09395.

42. N. Deporzio*, W.L. Xu*, **J. B. Muñoz**, and C. Dvorkin
Finding eV-scale Light Relics with Cosmological Observables
Phys.Rev.D 103 2, 023504 (2021). ArXiv: 2006.09380.

43. **J. B. Muñoz** and F.Y. Cyr-Racine
Cosmic Variance of the 21-cm Global Signal
Phys.Rev.D 103 2, 023512 (2021). ArXiv: 2005.03664.

44. R. Laha^, **J. B. Muñoz**^, and T. Slatyer^ **(^Alphabetical)**
INTEGRAL constraints on primordial black holes and particle dark matter
Phys.Rev.D 101,123514 (2020). ArXiv: 2004.00627 – **INTEGRAL paper of the month** (>200 cit.)

45. Y. Qin, A. Mesinger, J. Park, B. Greig, and **J. B. Muñoz**
A tale of two sites I: Inferring the properties of minihalo-hosted galaxies from current observations
MNRAS 495 1, 123 (2020) ArXiv: 2003.04442. (>50 citations)

46. **J. B. Muñoz**, C. Dvorkin, and F.Y. Cyr-Racine
Probing the Small-Scale Matter Power Spectrum with Large-Scale 21-cm Data
Phys.Rev. D 101, 063526 (2020). ArXiv: 1911.11144. (>75 citations)

47. **J. B. Muñoz**, V. Ravi, and A. Loeb
Periodic Fast Radio Bursts from Young Neutron Stars.
ApJ 890 162 (2020), ArXiv: 1909.00004.

48. D. Jyoti, **J. B. Muñoz**, R. Caldwell, and M. Kamionkowski
Cosmic Time Slip: Testing Gravity on Supergalactic Scales with Strong-Lensing Time Delays
Phys.Rev. D 100, 043031 (2019). ArXiv: 1906.06324.

49. **J. B. Muñoz**
Robust Velocity-induced Acoustic Oscillations at Cosmic Dawn
Phys.Rev. D 100, 063538 (2019). ArXiv: 1904.07881 **– Editor's Suggestion, highlighted in APS.**
(>75 citations)

50. C. Zeng, E.D. Kovetz, X Chen, Y. Gong**, J. B. Muñoz,** and M. Kamionkowski
Searching for Oscillations in the Primordial Power Spectrum with CMB and LSS Data
Phys.Rev. D 99, 043517 (2019). ArXiv: 1812.05105.

51. **J. B. Muñoz** and A. Loeb
Finding the Missing Baryons with FRBs and Sunyaev-Zeldovich Maps
Phys.Rev. D 98, 103518 (2018). ArXiv: 1809.04074.

52. **J. B. Muñoz** and C. Dvorkin
Efficient Computation of Galaxy Bias with Neutrinos and Other Relics.
Phys.Rev. D 98, 043503 (2018). ArXiv: 1805.11623.

53. **J. B. Muñoz,** C. Dvorkin and A. Loeb
21-cm Fluctuations from Charged Dark Matter.
Phys. Rev. Lett. 121, 121301 (2018). ArXiv: 1804.01092. (>100 citations)

54. A.M. Dizgah, H. Lee, **J. B. Muñoz** and C. Dvorkin
Galaxy Bispectrum from Massive Spinning Particles.
JCAP 1805, 013 (2018). ArXiv: 1801.07265. (>75 citations)

55. **J. B. Muñoz** and A. Loeb
Constraints on Dark Matter-Baryon Scattering from the Temperature Evolution of the IGM.
JCAP 1711, 043 (2017). ArXiv: 1708.08923.

56. **J.B. Muñoz** and M. Kamionkowski
Large-Distance Lens Uncertainties and Time-Delay Measurements of H_0.
Phys.Rev. D 96, 103537 (2017). ArXiv: 1708.08454.

57. T. L. Smith, **J.B. Muñoz**, R. Smith, K. Yee, and D. Grin
Baryons still trace dark matter: probing CMB lensing maps for hidden isocurvature.
Phys.Rev. D 96, 083508 (2017). ArXiv 1704.03461.

58. **J.B. Muñoz**, E. D. Kovetz, A. Raccanelli, M. Kamionkowski, and J. Silk
Towards a measurement of the spectral runnings.
JCAP 1705, 032 (2017). ArXiv 1611.05883. (>50 citations)

59. P.D. Meerburg, M. Münchmeyer, **J.B. Muñoz**, and X. Chen
Prospects for Cosmological Collider Physics.
JCAP 1703, 050 (2017). ArXiv: 1610.06559. (>100 citations)

60. I. Cholis, E.D. Kovetz, Y. Ali-Haïmoud, S. Bird, M. Kamionkowski
J.B. Muñoz, and A. Raccanelli.
Orbital eccentricities in primordial-black hole binaries.
Phys. Rev. D 94, 084013 (2016). ArXiv: 1606.07437. (>100 citations)

61. A. Raccanelli, E.D. Kovetz, S. Bird, I. Cholis, and **J.B. Muñoz**
Determining the progenitors of merging black-hole binaries.
Phys. Rev. D 94, 023516 (2016). ArXiv: 1605.01405. (>50 citations)

62. **J.B. Muñoz**, E.D. Kovetz, L. Dai, and M. Kamionkowski
Lensing of Fast Radio Bursts as a Probe of Compact Dark Matter

Phys. Rev. Lett. 117, 091301 (2016). ArXiv: 1605.00008 **– Editor's Suggestion, featured in** Futurity and the JHU HUB. (>200 citations)

63. M. Shiraishi, **J.B. Muñoz**, M. Kamionkowski, and A. Raccanelli
Violation of statistical isotropy and homogeneity in the 21-cm power spectrum
Phys.Rev. D 93, 103506 (2016). ArXiv: 1603.01206.

64. S. Bird, I. Cholis, **J.B. Muñoz**, Y. Ali-Haïmoud, M. Kamionkowski, E.D. Kovetz, A. Raccanelli, and A.G. Riess
Did LIGO detect dark matter?
Phys. Rev. Lett. 116, 201301 (2016). ArXiv: 1603.00464 **– Featured in** APS. (>1400 citations)

65. **J.B. Muñoz**, D. Grin, L. Dai, M. Kamionkowski, and E.D. Kovetz
Search for Compensated Isocurvature Perturbations with Planck Power Spectra.
Phys.Rev. D 93, 043008 (2016). ArXiv: 1511.04441. (>50 citations)

66. **J.B. Muñoz**, E.D. Kovetz, and Y. Ali-Haïmoud
Heating of Baryons due to Scattering with Dark Matter During the Dark Ages.
Phys.Rev. D 92, 083528 (2015). ArXiv: 1509.00029. (>150 citations)

67. **J.B. Muñoz**, Y. Ali-Haïmoud, and M. Kamionkowski
Primordial non-gaussianity from the bispectrum of 21-cm fluctuations in the dark ages.
Phys.Rev. D 92, 083508 (2015). ArXiv: 1506.04152 **– Editor's Suggestion.** (>150 citations)

68. **J.B. Muñoz** and M. Kamionkowski
Equation-of-State Parameter for Reheating.
Phys.Rev. D 91, 043521 (2015). ArXiv: 1412.0656. (>200 citations)

69. **J. Muñoz-Bermejo**, A. Asensio Ramos, and C. Allende Prieto
A PCA approach to stellar effective temperatures.
Astronomy & Astrophysics 553, A95 (2013). ArXiv: 1303.7218. (Undergraduate project as summer intern at the Instituto Astrofísico de Canarias.)

Selected white papers

Snowmass 2021(-23)

1. A. Drilica-Wagner et al. (including **J.B. Muñoz**)
Report of the Topical Group on Cosmic Probes of Dark Matter for Snowmass (arXiv: 2209.08215).
2. K. Boddy et al. (including **J.B. Muñoz**)
Astrophysical and Cosmological Probes of Dark Matter (arXiv: 2203.06380).
3. K. Bechtol et al. (including **J.B. Muñoz**)
Dark Matter Physics from Halo Measurements (arXiv: 2203.07354).
4. M. Alvarez et al. (including **J.B. Muñoz**)
Cosmological Simulations and Modeling (arXiv: 2203.07347).
5. C. Dvorkin et al. (including **J.B. Muñoz**)
The Physics of Light Relics (arXiv: 2203.07943).
6. S. Bird et al. (including **J.B. Muñoz**)
Primordial Black Hole Dark Matter (arXiv: 2203.08967, published in Phys. Dark. Univ.).

7. S. Aiola et al. (including **J.B. Muñoz**)
   CMB-HD White Paper (arXiv: 2203.05728).

Astro2020 (Decadal)

8. V. Ravi et al. (including **J.B. Muñoz**)
   Fast Radio Burst Tomography of the Unseen Universe (arXiv:1903.06535).
9. A. Liu et al. (including **J.B. Muñoz**)
   Cosmology with the Highly Redshifted 21cm Line (arXiv:1903.06240).
10. S. Furlanetto et al. (including **J.B. Muñoz**)
    Fundamental Cosmology in the Dark Ages with 21-cm Line Fluctuations (arXiv:1903.06240).
11. V. Gluscevic et al. (including **J.B. Muñoz**)
    Cosmological Probes of Dark Matter Interactions: The Next Decade (arXiv:1903.05140).
12. C. Dvorkin et al. (including **J.B. Muñoz**)
    Neutrino Mass from Cosmology: Physics Beyond the Standard Model (arXiv:1903.03689).

13. J.O. Burns et al. (including **J.B. Muñoz**)
    Dark Cosmology: Dark Matter & Exotic Physics in the Dark Ages using 21-cm (arXiv:1902.06147).

Others:

14. A. Loeb and **J.B. Muñoz**
    The First Stars May Shed Light on Dark Matter (Invited viewpoint for APS/PRL, arXiv:1807.01531).
15. K.A. Abazajian et al. (including **J.B. Muñoz,** I lead one of the parameter forecasts)
    CMB-S4 Science Book, First Edition (arXiv:1610.02743).