Yale Department of Physics

CHIARA M. F. MINGARELLI, PhD
Assistant Professor

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Positions

Assistant Professor of Physics, Yale University, 2023 —
Guest Researcher, Flatiron Institute, Center for Computational Astrophysics (CCA), 2023 —
Assistant Professor of Physics, University of Connecticut, 2020 — 2023
Associate Research Scientist, Flatiron Institute, CCA, 2019—2023

Ada Lovelace Director of Diversity, Flatiron Institute, CCA, 2019-2023

Increase diversity in computation astrophysics by advising on gender balance, and all issues pertaining to equity and inclusion at CCA. Focused on actively increasing the diversity of Flatiron Fellow applicant pool to hire a more diverse Fellows, and helping to create and develop the Inclusion, Diversity, Equity & Advocacy (IDEA) Scholar Program at the Flatiron Institute.

Flatiron Research Fellow 2017 - 2019

Marie Curie International Outgoing Fellow — 2014 - 2017

At Caltech, with visiting status at NASA's Jet Propulsion Laboratory, with the European reintegration phase at the Max Planck Institute for Radio Astronomy in Bonn, Germany.

Education

University of Birmingham, Birmingham, UK — PhD, 2014
University of Bologna, Bologna, Italy — M.Sc., 2009
Carleton University, Ottawa, Canada — B.Sc (Double Honours), 2006

Grants

- **Co-I, Finding massive BH binaries with gravitational waves and electromagnetic surveys,** LISA preparatory study #22-LPS22-0036, PI Jonathan Zrake, NASA, (2023-2026) $200,000.
- **PI, An Empirical Blueprint for the Gravitational-Wave Background**, NSF AAG Collaborative grant with Jenny E. Greene (2021-2024), $313,047.
- **Co-I , The NANOGrav Physics Frontier Center,** NSF Physics Frontier Center (2021-2026) $282, 503.
- **PI on four NASA Connecticut Space Grant** (Graduate and Undergraduate Students): total $32,000
  - Abigail Moran (2023) $6,000, Andrea Mejia (2023) $10,000, Bjorn Larsen (2022) $8,000, Andrew Casey-Clyde (2021) $8,000.
- **Simons Foundation, PI on the following awards,** total $146,101
  - 2023-2025, Award 1167523, Continuing Collaboration with the Flatiron Institute Institution: $76,738
  - 2022-2023, Award 1036401, Searching for anisotropy in the gravitational wave background: $49,363
  - 2020-2021, Award 840641, Research Support Grant: $20,000
- **UConn Postdoc Seed Award**: Dr. Deborah Good (2022-2023) $2,000
- **Amazon Web Services ML Award** — October 2018, Value of $120,000
- **Marie Curie International Outgoing Fellowship** — 2014 - 2017 , Project name "GW ASAP", Proposal number 623380, value €262,975 ($330,000)

Leadership, Mentorship, and Collaboration Work

- **Executive Committee** of NASA's Physics of the Cosmos Program Analysis Group (2023–2025)
- **Co-Chair of the Gravitational Wave Science Interest Group (GW SIG),** NASA Physics of the Cosmos (2023-2025).

- **Chair of the 2020 & 2021 Gravitational Wave International Committee (GWIC) — Braccini Thesis Prize Committee.** As chair I assembled a team of 15 experts to evaluate the best PhD thesis across all fields of gravitational-wave science.
- **Founder and Chair** of the International Pulsar Timing Array gravitational wave analysis working group (March 2018-March 2020; end of term).
- **Member** of the GWIC-Braccini Thesis Prize committee (2019).
- **Chair:** European Pulsar Timing Array detection working group (Jan 2017-2018).
- **NANOGrav Contributions:** I am currently leading the targeted search for supermassive black hole binaries with the NANOGrav 15-yr data, am part of the leadership team for a new harmonic analysis of the GW background for the 15-yr data, for making principal component maps of the GW background with the 15-yr data, and for creating custom noise models for the 15-yr pulsars. Furthermore, I wrote the astrophysical interpretation of the 12.5-yr GW background results, the astrophysical interpretation of the 11-yr continuous GW searches, led the first astrophysical interpretation of the 9-year data; conceived of and ran analyses for primordial GWs for 9-yr data, carried out first search for anisotropy in the 9-yr data — results never published due to "anomaly" present in data which is an outstanding issue, and led the change in reporting GW limits from strain-only to $\Omega_{gw}(f)$ which is more general.
- **Solar, Art Installation, CCA**: Together with David Spergel, I led the commissioning of a custom piece of scientific art for CCA from artist Lia Halloran. Halloran has also worked with Harvard and Caltech.
- **OzGrav Governance Committee (2017-2023):** OzGrav is a multimillion Australian GW collaboration. The governance committee meets at least once a year to advice on how OzGrav is run.
- **Supernova Foundation:** scientific mentor to women in astronomy and astrophysics in developing countries (July 2017 - January 2020).
- **Caltech Women Mentoring Women:** scientific mentor to women at Caltech (Oct 2014 — Jul 2016).

Teaching, Mentoring, and Thesis Committees

Graduate Advising: Andrew Casey-Clyde (PhD advisor 2019—, UConn), Bjorn Larsen (PhD advisor 2021—, Yale), London Willson (PhD advisor 2022—, UConn), Sean Oh (Master's advisor, 2020).

Undergraduate Advising: Yu-Ting Chang (Yale, 2023 —), Rohan Shivakumar (Yale, 2023 —), Ellis Eisenberg (Yale, 2024 —), John Kieley (Yale, 2023 —), Nicole Khusid (Senior Thesis Advisor and SURF, 2021-2023), Abigail Moran (Undergraduate Research, Senior Thesis Advisor, and SURF, UConn 2021–2023), Chengcheng Xin (2019-2020, undergraduate, Columbia University and CCA), Brianna Isola (2018-2019, undergraduate, CCA and Stony Brook), Morgan Nañez (2018-2019, undergraduate, CCA and UC Berkeley).

Teaching at Yale: AY 2023-2024 PHYS 166 (lab class), PHYS/ASTR 343 (Intro to astrophysics, relativity, and cosmology).

Teaching at UConn: AY 2020-2021 PHYS 1501 (Intro Physics), PHYS 2701 (Intro to astrophysics).

PhD Thesis Committees:

- External Examiner: Andrea Derdzinki (Supervisor Zoltan Haiman, Columbia University, 2020), Aurelien Chalumeau (Supervisor Stas Babak, University Paris Cité, 2021)
- Internal Committees: Chuan Tian (Supervisor Meg Urry, Yale, 2023), Jakob Kastelic (Supervisor Steve Lamoreaux, Yale, 2024)

Telescope Use

- **Co-I Green Bank Telescope (1723.50 hours),** The North American Nanohertz Observatory for Gravitational Waves, GBT24B-427 (May 2024)
- **Co-I Green Bank Telescope (21 hours),** High-Impact MSPs for the International Pulsar Timing Array, GBT17A-353 (Nov 2016)
- **Co-I Arecibo Telescope (32.5 hours),** High-Impact MSPs for the International Pulsar Timing Array, P3133 (Sep 2016)

Referee Service Work

Nature Astronomy, Physical Review Letters, Physics Letters B, Physical Review D, Astrophysical Journal, Astrophysical Journal Letters, Monthly Notices of the Royal Astronomical Society, Classical and Quantum Gravity, and the Journal of Cosmology and Astroparticle Physics (JCAP). NSF Astronomy and Physics Grants, and NASA grant panels.

Code Sharing for the Scientific Community

Codes and lecture notes are available on github account, https://github.com/ChiaraMingarelli. Primarily in Python and publish my codes with Jupyter notebooks. Public codes from Mingarelli et al. (2017) have been widely used by the community, including researchers at Imperial College London, CCA and UConn.

Selection of Prizes, Honors and Awards

- ICBS Frontiers of Science Award in Theoretical Physics, 2024. Shared with NANOGrav.
- Marie Curie Alumni Association, 2023 Career Award, €1500, awarded 03/2024.
- Public Voices Fellow at Yale University, The OpEd Project, 2023-2024.
- American Astronomical Society, HEAD Early Career Award, 2023.
- Nature "Inspiring Women in Science Award", Scientific Achievement Category, 2022 runner-up.
- Marie Curie International Outgoing Fellowship — 2014 - 2017.
- Marie Curie Actions "Communicating Science" Prize for 2017.
- Woman Physicist of the Month, American Physical Society, November 2016.
- Springer Thesis Award — 2015, Thesis published by Springer Theses with $650 cash prize.

Recent Conference and Meeting Organization

- Aspen 2025 Winter Conference Organizer: "The Era of Binary Supermassive Black Holes: Coordination of Nanohertz-Frequency Gravitational-Wave Follow-up"
- SOC Chair, Yale Gravitational Wave Symposium, Yale University, November 20th-21st 2023
- SOC Chair, NANOGrav Spring Meeting, CCA, NY, March 2022
- SOC, Gravitational Wave Physics and Astronomy Workshop (GWPAW), AEI Hannover, December 2021
- SOC, Fast Radio Bursts: theory meets observations, CCA Feb 2020
- SOC, NANOGrav Collaboration Meeting, Cornell, October 2019
- SOC Chair, Eternal Multimessenger Workshop, CCA, NY, August 2018
- SOC Chair, 1st International Pulsar Timing Array Hack Week, CCA, NY, December 2017

Public Engagement in Science

Selection of Television Appearances and Podcasts:

- World Science Festival with Brian Greene, "Gravitational Waves and the Dark Universe"
- Robinson Erhardt Podcast, "Chiara Mingarelli: Supermassive Black Holes & the Gravitational Wave Background", Episode 108
- Sean Carroll's "Mindscape" podcast, "Searching for Black Holes with Pulsars", episode 212
- Cool Worlds Podcast, "Chiara Mingarelli - NANOGrav, Background Gravitational Waves, Black Holes", Episode 3
- Science In Action — BBC World Service "Melting of Greenland ice sheet"
- Daniel and Jorge Explain the Universe "How to use the whole galaxy to hear huge gravitational waves"
- Origins with Dr. Natasha Wilson "Dr. Chiara Mingarelli: Starry Night Skies, Supermassive Black Holes, and Wavy Spacetime"
- How the Universe Works — Science Channel, Seasons 5, 7, 8, 9 and 10
- Nova's "Universe, Orbital Path podcast with Michelle Thaller;
- Story Collider podcast, "How I Ended Up At the Center of the Universe"

Popular Science Articles

Nautilus Magazine, “A Supermassive Test for Einstein’s Famous Theory”, by Melize Ferrus and CMF Mingarelli; Scientific American, “Searching for the Gravitational Waves LIGO Can't Hear”, by CMF Mingarelli, 2016; Amy Poehler Smart Girls, “Conversations with a Theoretical Astrophysicist”, invited blog series for Women’s Month 2016

High Profile Public Lectures

Amazon MARS 2017 — 2024. Two talks given to Jeff Bezos (2017 and 2024); Dreamworks Animation Studios, Los Angeles, CA, USA; Ad Astra Academy (owned by Elon Musk), Bel Air, CA; Adler Planetarium, “Adler After Dark”, Chicago, IL, USA.

Recent Invited Talks

Over 80 invited talks at world-class research institutes such as Caltech, Princeton, Harvard, and NASA Headquarters, as well as high-profile meetings such as the American Astronomical Society, LISA symposium, and Amaldi. A complete list of talks is available upon request.

1. Royal Swedish Academy of Science, Gravitational Wave Symposium, invited lecture, June 2024
2. Black Hole Initiative annual meeting, invited talk, May 2024
3. Leung Center for Center for Cosmology & Astroparticle Physics, National Taiwan University, March 2024
4. APS March Meeting, Plenary Talk in the Kavli Symposium, March 2024
5. Rutgers Department of Physics & Astronomy Colloquium, New Brunswick, December 2023
6. McGill Physical Society Colloquium, Montreal, December 2023
7. Flatiron Institute, “Black Holes on Broadway”, Plenary talk, December 2023
8. NYU Physics Department Colloquium, November 2023
9. CMB-S4 Summer Meeting, Plenary Talk, August 2023
10. Dark Side of the Universe 2023, Kigali Rwanda, Plenary Talk, July 2023
11. Giant Magellan Telescope Community Meeting, Plenary Talk, September 2022
12. TeVPA, Plenary Talk, Queen’s University, August 2022
13. ZTH Colloquium, Zurich, May 2022
14. Yale University, Department of Astronomy Colloquium, April 2022
15. Johns Hopkins & Space Telescope Science Institute Colloquium, March 2022
16. Cambridge Cosmology Seminar, March 2022
17. Galileo Galilei Institute, Colloquium, Florence, November 2021
18. Amaldi 14, Plenary Talk on the NANOGrav 12.5-yr results, July 2021
19. Stony Brook University, Astronomy Seminar, May 2021
20. Padova Cosmology Seminar Series, Padova, Italy, April 2021
21. Primordial Black Holes Confront GW Data, Plenary Talk, Rome, February 2021
22. GRASP Colloquium, Utrecht University, Netherlands, January 2021
23. Columbia University, Astronomy Colloquium, January 2021
24. CU Boulder, Departmental Colloquium, November 2020
25. Swarthmore University, Departmental Colloquium, November 2020
26. University College London, Astronomy Seminar Series, October 2020
27. Copernicus Webinar Series, October 2020
28. New York University, High Energy Physics Seminar, Department of Physics, February 2020
29. California Institute of Technology, TAPIR Seminar, January 2020

Publications

Summary statistics: h index: 54; citations: 13,659 as of April 3rd, 2024 on Google Scholar; refereed papers 91, total 114.

Monographs

- **C. M. F. Mingarelli**, Introduction to Gravitational Wave Astronomy, under contract with Princeton University Press. Expected publication Fall 2026.
- **C. M. F. Mingarelli**, Gravitational Wave Astrophysics with Pulsar Timing Arrays, Springer Thesis Series 2016, ISBN 978-3-319-18400-5.

An asterisk * denotes a paper led by one of my students. I have also listed my PTA-related papers and not the LIGO ones, since they are most relevant here. I have a large group and many students have recently submitted papers to ApJ.

Submitted

1. J. A. Casey-Clyde, **C. M. F. Mingarelli**, et al., The NANOGrav 15 yr Data Set: Looking for Signs of Discreteness in the Gravitational-wave Background, submitted to ApJ, arXiv:2404.07020
2. B. Larsen*, **C. M. F. Mingarelli**, et al., The NANOGrav 15 yr Data Set: Chromatic Gaussian Process Noise Models for Six Pulsars, submitted to ApJ (under review)
3. A. Moran*, **C. M. F. Mingarelli,** K. Van Tilburg, D. Good*, A Pulsar-Based Map of Galactic Acceleration, submitted to Phys Rev D. (under review)
4. J. A. Casey-Clyde*, **C. M. F. Mingarelli,** J. E. Greene, A. D. Goulding, S. Chen, J. R. Trump, Quasars Likely Host Supermassive Black Hole Binaries, submitted to ApJ (under review)
5. J. Nay, K. K. Boddy, T. L. Smith, **C. M. F. Mingarelli,** Harmonic Analysis for Pulsar Timing Arrays, arXiv:2306.06168, submitted to Phys. Rev D. (under review)

First author and Mingarelli Group papers

6. **C. M. F. Mingarelli,** The black hole revolution needs you!, Nature Astronomy, Volume 8, Issue 2 (2024).
7. N. Khusid*, **C. M. F. Mingarelli**, P. Natarajan, J. A. Casey-Clyde*, A Barnacka, Strongly Lensed Supermassive Black Hole Binaries as Nanohertz Gravitational-wave Sources, ApJ, Volume 955, Number 1 (2023).
8. A. Moran*, **C. M. F. Mingarelli,** M. Bedell, D. Good*, D. N. Spergel, Improving Distances to Binary Millisecond Pulsars with Gaia, ApJ, Volume 954, Number 1 (2023).
9. **C. M. F. Mingarelli** and J. A. Casey-Clyde*, PTAs: The Next Window on the Gravitational-Wave Universe, Science 378 (6620), (2023).
10. J. A. Casey-Clyde*, **C. M. F. Mingarelli,** J. E. Greene et al., An AGN-based supermassive black hole binary population model: implications for the gravitational-wave background, ApJ, Volume 924, 2 (2022).
11. C. Xin*, **C. M. F. Mingarelli,** J. S. Hazboun, Multimessenger pulsar timing array constraints on supermassive black hole binaries traced by periodic light curves, ApJ Volume 915, Issue 2 (2021).
12. **C. M. F. Mingarelli,** Pulsar Timing Arrays: The Next Window on the Gravitational-Wave Universe, Nature Astronomy, Volume 3 (2019).

13. **C. M. F. Mingarelli** and A. B. Mingarelli, Proving the short-wavelength approximation in Pulsar Timing Array gravitational-wave background searches, J. Phys. Commun. 2 105002 (2018).

14. **C. M. F. Mingarelli**, T. J. W. Lazio, A. Sesana et al., The local nanohertz gravitational-wave landscape from supermassive black hole binaries, Nature Astronomy, Volume 1 (2017)[1].

15. **C. M. F. Mingarelli** for NANOGrav, Interpreting the Recent Upper Limit on the Gravitational Wave Background from the Parkes Pulsar Timing Array; arXiv:1602.06301 (2016).

16. **C. M. F. Mingarelli**, J. Levin, T. J. W. Lazio, Fast Radio Bursts and Radio Transients from Black Hole Batteries, ApJL, Volume 814, L20 (2015).

17. **C. M. F. Mingarelli**, T. Sidery. Effect of small interpulsar distance variations in stochastic gravitational wave background searches with Pulsar Timing Arrays, Phys. Rev. D 90, 062011 (2014)[2].

18. **C. M. F. Mingarelli**, T. Sidery, I. Mandel and A. Vecchio. Characterizing stochastic gravitational wave background anisotropy with Pulsar Timing Arrays. Phys. Rev. D 88, 062005 (2013).

19. **C. M. F. Mingarelli**, K. Grover, T. Sidery, R. J. E. Smith, and A. Vecchio. Observing the Dynamics of Supermassive Black Hole Binaries with Pulsar Timing Arrays. Phys. Rev. Lett., 109, 081104 (2012)[3].

Short author papers

20. R. J. Jennings with **C. M. F. Mingarelli** et al., An unusual pulse shape change event in PSR J1713+0747 observed with the Green Bank Telescope and CHIME, ApJ, Volume 964, Issue 2 (2024).

21. M. Koss with **C. M. F. Mingarelli** and J. A. Casey-Clyde* et al., "UGC 4211: A Confirmed Dual AGN at 230 pc Nuclear Separation", Volume 942, Issue 1, L24 (2023).

22. M. Renzo*, T. Callister*, K.Chatziioannou, L. Van Son, **C. M. F. Mingarelli** et al. Prospects of gravitational-waves detections from common-envelope evolution with LISA, ApJ, Volume 919, Issue 2 (2021).

23. Y. Ali-Haïmoud, T. L. Smith, **C. M. F. Mingarelli,** Insights into searches for anisotropies in the nanohertz gravitational-wave background, Phys. Rev. D, Volume 103, Issue 4, article id.042009 (2021).

24. G. Ogiya, O. Hahn, **C. M. F. Mingarelli**, M. Volonteri, Accelerated orbital decay of supermassive black hole binaries in merging nuclear star clusters, MNRAS, Volume 493, Issue 3, p.3676-3689 (2020).

25. K. Breivik*, **C. M. F. Mingarelli,** S. L. Larson, Constraining Galactic Structure with the LISA White Dwarf Foreground, ApJ, Volume 901, Issue 1, id.4, 9 pp. (2020).

26. Y. Ali-Haïmoud, T. L. Smith, **C. M. F. Mingarelli,** Fisher formalism for anisotropic gravitational-wave background searches with pulsar timing arrays, Phys. Rev. D, Volume 102, Issue 12, article id.122005 (2020).

27. A. Goulding, K. Pardo, J. Greene, **C. M. F. Mingarelli** et al., Discovery of a Close-separation Binary Quasar at the Heart of a z ~ 0.2 Merging Galaxy and Its Implications for Low-frequency Gravitational Waves, ApJL, Volume 879, Issue 2, article id. L21, 7 pp. (2019).

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[1] This was the first PTA paper to appear in a Nature journal. Nature Astronomy commissioned a News & Views article to be written about the importance of this work, see L. Moustakas, Nature Astronomy Volume 1, 825--826 (2017)

[2] Selected for APS Kaleidoscope

[3] Highlighted in APS "Physics". Synopsis: Sailing Choppy Gravitational Seas

28. C. Conneely, A. H. Jaffe, **C. M. F. Mingarelli**, On the Amplitude and Stokes Parameters of a Stochastic Gravitational-Wave Background, MNRAS Volume 487, Issue 1, p.562-579 (2019).

29. J. Hazboun, **C. M. F. Mingarelli,** K. Lee, The Second International Pulsar Timing Array Mock Data Challenge, arXiv:1810.10527 (2018).

30. P. Lasky, **C. M. F. Mingarelli**, T. Smith et al., Gravitational-wave cosmology across 29 decades in frequency, Phys. Rev. X, Volume 6, Issue 1, 011035 (2016)[4].

31. S. R. Taylor, M. Vallisneri, J. A. Ellis, **C. M. F. Mingarelli**, T. J. W. Lazio, R. van Haasteren, Are we there yet? Time to detection of nanohertz gravitational waves based on pulsar-timing array limits, ApJL, Volume 819, L6 (2016).

32. S. R. Taylor, **C. M. F. Mingarelli,** J. R. Gair, et al. Limits on anisotropy in the nanohertz stochastic gravitational-wave background Phys. Rev. Lett. 115, 041101 (2015).

33. G. Janssen with **C. M. F. Mingarelli** et al., Gravitational wave astronomy with the SKA, Proceedings of Science (2014), arXiv:501.00127

34. J. R. Gair, J. D. Romano, S. R. Taylor, **C. M. F. Mingarelli**, Mapping gravitational-wave backgrounds using methods from CMB analysis: Application to pulsar timing arrays, Phys. Rev. D 90, 082001 (2014)[5].

35. J. D. Romano, S. R. Taylor, N. J. Cornish, J. Gair, **C. M. F. Mingarelli**, R. van Haasteren, Phase-coherent mapping of gravitational-wave backgrounds using ground-based laser interferometers, Phys. Rev. D 92, 042003 (2015).

36. A. Y. Kamenshchik and **C. M. F. Mingarelli**, A generalized Heckmann-Schücking cosmological solution in the presence of a negative cosmological constant. Phys. Lett. B (693), 213 (2010).

37. A. B. Mingarelli and **C. M. F. Mingarelli**, Conjugate points in the gravitational n-body problem, Celest. Mech. Dynam. Astron. 91, 391 (2005).

38. R. van Haasteren, **C. M. F. Mingarelli**, A. Vecchio, A. Lassus, Analysis of the first IPTA Mock Data Challenge by the EPTA timing data analysis working group, arXiv:1301.6673v1 (2013).

39. A. Lassus, R. van Haasteren, **C. M. F. Mingarelli**, K. J. Lee, A. Vecchio, Data Analysis Library for Gravitational Wave Detection, Proceedings IAU Symposium No. 291, Volume 8, pp 438-440 Beijing, China, August (2012).

Collaboration papers

40. G. Agazie with **C. M. F. Mingarelli** et al., The NANOGrav 15-year data set: Search for Transverse Polarization Modes in the Gravitational-Wave Background, ApJ Letters, Volume 964, Issue 1, L14 (2024).

41. A. D. Johnson with **C. M. F. Mingarelli** et al., NANOGrav 15-year Gravitational-Wave Background Analysis Pipeline, eprint arXiv:2306.16223 (in press PRD).

42. G. Agazie with **C. M. F. Mingarelli** et al., G. Comparing recent PTA results on the nanohertz stochastic gravitational wave background, arXiv:2309.00693 (in press ApJ)

43. G. Agazie with **C. M. F. Mingarelli** et al., The NANOGrav 12.5 yr Data Set: A Computationally Efficient Eccentric Binary Search Pipeline and Constraints on an Eccentric Supermassive Binary Candidate in 3C 66B, ApJ, Volume 963, Issue 2 (2024).

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[4] Highlighted in APS “Physics". Synopsis: Homing in on Primordial Gravitational Waves

[5] Editor's Suggestion, Phys. Rev. D Highlights

44. G. Agazie with **C. M. F. Mingarelli** et al., The NANOGrav 12.5-year Data Set: Search for Gravitational Wave Memory, ApJ, Volume 963, Issue 1 (2024).

45. B. Bécsy with **C. M. F. Mingarelli** et al., How to Detect an Astrophysical Nanohertz Gravitational-Wave Background, ApJ, Volume 959, Volume 9 (2023).

46. G. Agazie with **C. M. F. Mingarelli** et al., The NANOGrav 15-year Data Set: Search for Anisotropy in the Gravitational-Wave Background, APJL Volume 956,1, L3 (2023).

47. G. Agazie with **C. M. F. Mingarelli** et al., The NANOGrav 15 yr Data Set: Evidence for a Gravitational-wave Background, APJL Volume 951, 2 (2023).

48. G. Agazie with **C. M. F. Mingarelli** et al., The NANOGrav 15 yr Data Set: Observations and Timing of 68 Millisecond Pulsars, APJL Volume 951, 2 (2023).

49. G. Agazie with **C. M. F. Mingarelli** et al., The NANOGrav 15 yr Data Set: Detector Characterization and Noise Budget, APJL Volume 951, 1 (2023).

50. Z. Arzoumanian with **C. M. F. Mingarelli** et al., The NANOGrav 12.5 yr Data Set: Bayesian Limits on Gravitational Waves from Individual Supermassive Black Hole Binaries, APJL Volume 951, 2 (2023).

51. G. Agazie with **C. M. F. Mingarelli** et al., The NANOGrav 15 yr Data Set: Bayesian Limits on Gravitational Waves from Individual Supermassive Black Hole Binaries, APJL Volume 951, 2 (2023).

52. G. Agazie with **C. M. F. Mingarelli** et al., The NANOGrav 15 yr Data Set: Constraints on Supermassive Black Hole Binaries from the Gravitational-wave Background, APJL, Volume 952, 2 (2023).

53. Z. Arzoumanian with **C. M. F. Mingarelli** et al., The NANOGrav 12.5-year Data Set: Search For An Isotropic Stochastic Gravitational-Wave Background, ApJL Volume 905, Issue 2, id.L34, 18 pp. (2020).

54. Z. Arzoumanian with **C. M. F. Mingarelli** et al., Multimessenger Gravitational-wave Searches with Pulsar Timing Arrays: Application to 3C 66B Using the NANOGrav 11-year Data Set, ApJ, Volume 900, Issue 2 (2020).

55. K. Aggarwal with **C. M. F. Mingarelli** et al., The NANOGrav 11 yr Data Set: Limits on Gravitational Waves from Individual Supermassive Black Hole Binaries, ApJ 880, Issue 2, article id. 116, 11 pp. (2019).

56. N. Pol with **C. M. F. Mingarelli** et al., Astrophysics Milestones For Pulsar Timing Array Gravitational Wave Detection, ApJL, Volume 911, Issue 2, id.L34, 10 pp. (2021).

57. M. Alam with **C. M. F. Mingarelli** et al., The NANOGrav 12.5-year Data Set: Wideband Timing of 47 Millisecond Pulsars, ApJS, Volume 252, Issue 1, id.5, 53 pp. (2021).

58. M. Alam with **C. M. F. Mingarelli** et al., 12.5 yr Data Set: Observations and Narrowband Timing of 47 Millisecond Pulsars, ApJS, Volume 252, Issue 1, id.4, 48 pp. (2021).

59. M. Vallisneri with **C. M. F. Mingarelli** et al., Modeling the Uncertainties of Solar System Ephemerides for Robust Gravitational-wave Searches with Pulsar-timing Arrays, ApJ, Volume 893, Issue 2, id.112, 11 pp. (2020).

60. J. Hazboun with **C. M. F. Mingarelli** et al., The NANOGrav 11 yr Data Set: Evolution of Gravitational-wave Background Statistics, ApJ, Volume 890, Issue 2, id.108, 15 pp. (2020).

61. K. Aggarwal with **C. M. F. Mingarelli** et al., The NANOGrav 11 yr Data Set: Limits on Gravitational Wave Memory, ApJ, Volume 889, Issue 1, id.38, 11 pp. (2020).

62. G. Hobbs with **C. M. F. Mingarelli** et al., A pulsar-based time-scale from the International Pulsar Timing Array, MNRAS, Volume 491, Issue 4, p.5951-5965 (2020).

63. L. Barack with **C. M. F. Mingarelli** et al., Black holes, gravitational waves and fundamental physics: a roadmap, CQG, Volume 36, Issue 14, article id. 143001 (2019)[6].

64. S. Burke-Spolaor with **C. M. F. Mingarelli** et al., The astrophysics of nanohertz gravitational waves, T A&A Review, Volume 27, Issue 1, article id. 5, 78 pp. (2019)

65. B. B. P. Perera with **C. M. F. Mingarelli** et al., The International Pulsar Timing Array: Second data release, MNRAS, Volume 490, Issue 4, p. 4666-4687 (2019).

66. D. R. Madison with **C. M. F. Mingarelli** et al., The NANOGrav 11-year Data Set: Solar Wind Sounding Through Pulsar Timing, ApJ Volume 872, Issue 2, article id. 150, 13 pp. (2019).

67. R. N. Caballero with **C. M. F. Mingarelli** et al., Studying the solar system with the International Pulsar Timing Array, MNRAS Volume 481, Issue 4, p.5501-5516 (2018).

68. Z. Arzoumanian with **C. M. F. Mingarelli** et al., The NANOGrav 11-year Data Set: Pulsar-timing Constraints On The Stochastic Gravitational-wave Background, ApJ, Volume 859, Issue 1, article id. 47, 22 pp. (2018).

69. Z. Arzoumanian with **C. M. F. Mingarelli** et al., The NANOGrav Eleven-year Data Set: High-precision timing of 45 Millisecond Pulsars, ApJS, Volume 235, Issue 2, article id. 37, 41 pp. (2018).

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