

C.V. for Steven Murray

CONTACT INFORMATION

School of Earth and Space Exploration
Arizona State University,
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steven-murray.github.io

in steven-g-murray

steven-murray

ACADEMIC REFERENCES

Prof. Judd Bowman

judd.bowman@asu.edu

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Dr. Cathryn Trott

cathryn.trott@curtin.edu.au

(+61)8 9266 1306

Prof. Andrei Mesinger

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RESEARCH INTERESTS

21cm Cosmology:

validation, parameter inference, statistical foreground modelling, connecting instruments to theoretical predictions, simulations.

Large-scale structure:

halo mass function, halo model, warm dark matter, fast synthetic catalogues.

Astrostatistics:

hierarchical Bayesian models, non-parametric statistics, count distributions, PCA.

Software and computing:

high-standard development practices, accessible web-applications for the community, robust mathematical tools in Python.

EDUCATION

University of Western Australia

Perth, Western Australia

PhD, Physics

(2012–2015)

– Thesis Title:

Next-generation tools for next-generation surveys

– Supervisors:

Prof. Chris Power, Dr. Aaron Robotham

– Area of Study:

Cosmology/Structure formation

– Courses Taken:

– General Relativity (HD)

– Computer Intensive Methods in Statistics (D)

– Bayesian Astronomy in R

Honours, Physics

(2011)

– Graduated:

First Class

– Thesis Topic:

Large-Scale Structure in the SDSS and GAMA surveys

– Supervisor:

Prof. John Hartnett

– Courses Taken:

– Differential Geometry (HD)

– Mathematical Methods (HD)

– Computational Quantum Mechanics (D)

– Astrophysics (D)

University of Queensland

Brisbane, Queensland, Australia

Bachelor of Science in Mathematics

(2007-2009)

– Graduated:

GPA of 6.583/7

PROFESSIONAL EXPERIENCE

Arizona State University

Tempe, Arizona

HERA/EDGES Postdoc, (2018 –)

Curtin University, Perth, Western Australia
CAASTRO Postdoc, (2015 – 2018)

University of Western Australia, Perth, Western Australia
APA funded PhD student, (2012 – 2015)

ICRAR/Pawsey, Perth, Western Australia
ICRAR/Pawsey Summer Internship, (2011 – 2012)

University of Western Australia, Perth, Western Australia
First-year Physics Lab Demonstration Tutor, (2011)

University of Queensland, Brisbane, Queensland
First-year Mathematics Tutor, (2009)

SOFTWARE Complete information at github.com/steven-murray.

Organizations

Most of my software development occurs within teams, which are listed here (only organizations in which I've been active in the last year and are a member are listed). Each column gives the total number of my contributions made to the organization, and then shows the relative contribution (percentage) of the contributions in the form of **C**ommits, **P**Rs, **I**ssues and **R**eviews.

Github Org	Description	Contr.	[C P I R]
HERA-Team	Collection of software used for the HERA radio telescope	576	[425 34 72 45]
edges-collab	Collection of codes for working with EDGES data	288	[254 10 19 05]
21cmfast	Core team that develops 21cmFAST and associated packages	167	[124 02 26 15]
RadioAstronomySoftwareGroup	Foundational software tools for radio astronomy	145	[114 04 11 16]
halomod	Halo Model calculations	93	[076 02 08 07]

Original Codes

Here I list notable codes that I originally authored and maintain. Much of my current development work occurs in collaborative software, which is listed below.

Key: ☆ GH Stars | 🍴 Forks

Repo	Description	☆	🍴
halomod/hmf	Python halo mass function calculator	69	34
steven-murray/hankel	Implementation of Ogata's (2005) method for Hankel transforms.	40	04
halomod/halomod	Python package for dealing with the Halo Model	20	09
steven-murray/powerbox	A python package for making arbitrarily structured, arbitrary-dimension boxes	19	09
halomod/TheHaloMod-SPA	Single-page app for TheHaloMod	03	00
steven-murray/mrpy	A Python package for calculations with the MRP parameterisation of the Halo Mass Function.	01	01

Collaborative Codes

Here I list notable codes that I contribute to collaboratively. They are listed in descending order of my total number of contributions.

Key: ☆ GH Stars | 🍴 Forks | 📊 My Rank as Contributor | ➕ My Contributions

Repo	Description	☆	🍴	➕	📊
21cmFAST	Official repository for 21cmFAST: a code for generating fast simulations of the cosmological 21cm signal	42	23	934 (61%)	1/11
edges-analysis	Analysis pipeline for EDGES field data.	1	0	557 (79%)	1/4
hera_sim	Simple simulation code for HERA-like redundant interferometric arrays	15	7	539 (31%)	2/19
edges-cal	Code to calibrate EDGES data	0	1	507 (92%)	1/4
21CMC	Constrain 21cmFAST parameters using MCMC	4	9	421 (59%)	1/7
edges-io	Module for reading EDGES data and working with EDGES databases	0	0	410 (92%)	1/4
vis_cpu	Fast approximate visibility simulator	1	1	210 (65%)	1/9
edges-estimate	Analysis code for fitting EDGES data with foregrounds and 21 cm signatures	0	1	186 (77%)	1/4
read_acq	Read EDGES ACQ files with Python	2	0	143 (89%)	1/4
cosmotile	Generate lightcones from coeval boxes	0	1	121 (59%)	1/3

ACADEMIC EXPERIENCE

Grants

2012 – Present

- S. Furlanetto, J. Mirocha, P. La Plante, D. Jacobs, S. G. Murray, 2022, ‘*A new window into galaxy physics and environments during cosmic dawn through cross-correlations*’, NASA ATP.
- S. G. Murray, A. Mesinger, 2022, ‘*FORWARD: Forward-Models of Cosmic Dawn: connecting 21cm simulations to the real world*’, Marie Curie Fellowship.
- S. G. Murray, J. D. Bowman, D. C. Jacobs, 2022, ‘*Probing Cosmic Dawn with End-to-End Forward Models*’, NSF AAG.
- P. La Plante, S. Furlanetto, S. G. Murray, 2022, ‘*Collaborative Research: Exploring Reionization and the Cosmic Dawn through Cross-Correlations*’, NSF AAG.
- S. G. Murray et. al., 2022, ‘*Unveiling Cosmic Dawn with HERA*’, XSEDE Allocation.
- S. G. Murray et. al., 2021, ‘*Unveiling Cosmic Dawn with HERA*’, XSEDE Allocation.
- S. G. Murray et. al., 2020, ‘*Unveiling Cosmic Dawn with HERA*’, XSEDE Startup Allocation.
- Lisa Kewley et al. (Murray listed as Ass. Investigator), 2017, ‘*ASTRO 3D*’, ARC CoE.
- Chris Power et. al., 2013, ‘*Fast, approximate synthetic universes for the SKA*’, UWA Research Collaboration Awards.
- Chris Power, S. G. Murray, 2012, ‘*Building model universes for the Square Kilometre Array and its pathfinders*’, UWA Research Collaboration Awards.
- Aaron Robotham et al., 2012, ‘*Building galaxies with trees*’, UWA Research Collaboration Awards.

Collaborations

2013 – Present

- Network for Exploration and Space Science [CI Jack Burns], (2020 –)
- EDGES [CI Judd Bowman], (2019 –)
- 21cmFAST [CI Andrei Mesinger], (2019 –)
- HERA [CI Dave DeBoer], (2018 –)
- GENESIS Project (Primary Liaison between MWA EoR and GENESIS) [CI Chris Power & Cath Trott], (2017 – 2018)
- ASTRO 3D (Affiliate Investigator, Listed as Associate Investigator on Proposal) [CI Lisa Kewley], (2017 –)
- SKA CD/EoR SWG [CI Leon Koopmans], (2017 –)

- MWA EoR Team, ICRAR/Curtin [CI Cathryn Trott], (2015 – 2018)
- Computational Theory Group, ICRAR/UWA [CI Chris Power], (2013 – 2018)
- UAM, Madrid [CI Alexander Knebel], (2013 – 2014)

Memberships and Committees

2012 – Present

- HERA DE&I Committee [Chair], (2022 – 2022)
- HERA Ombudsperson [Ombudsperson], (2021 –)
- SKA CD/EoR SWG [Member], (2017 –)
- ASA [Member], (2017 –)
- CAASTRO Postdoc Committee [Member], (2016 – 2018)
- CAASTRO Student Committee [Chair], (2014 – 2015)
- CAASTRO [Member], (2012 – 2018)

Journal Referee

2017 – Present

- Referee for PASA (2022 –)
- Referee for A&A (2021 –)
- Referee for JOSS (2019 –)
- Referee for MNRAS (2017 –)

Supervision

2017 – Present

- Supervised Undergraduate : Haina Huang (2022 – 2022)
- Supervised Undergraduate : Dhanush Giriyan (2021 – 2021)
- Co-supervised Undergraduate : ASU Soft. Eng. Capstone Team (2021 – 2022)
- Supervised Undergraduate : ASU Soft. Eng. Capstone Team (2020 – 2021)
- Supervised Undergraduate : Lily Whitler (2019 – 2020)
- Co-supervised PhD student: Bella Nasirudin (2017 – 2020)

Teaching

2004 – Present

- First-Year Undergraduate Physics: *Lab Demonstration; Report Grading* (UWA, 2011 – 2011)
- First-Year Undergraduate Mathematics: *Class Tutor; Assignment Grading* (UQ, 2009 – 2009)
- Yr 10-12 Mathematics: *Private Tutor* (Private, 2006 – 2010)
- Yr 10-12 Chemistry: *Private Tutor* (Private, 2006 – 2010)
- Yr 10-12 Physics: *Private Tutor* (Private, 2006 – 2010)
- Grades Pre-2 Piano: *Private Tutor* (Private, 2004 – 2020)

Outreach

2016 – Present

- [Outreach video for ASU Open Door](#) (Arizona State University, 2021)
- Outreach stall at ASU Open Door (Arizona State University, 2020)
- [Elementary School Presentation: “Deserts and Radio Astronomy”](#) (Eagleridge Enrichment Center, 2019)
- Outreach Stall at Perth Science Festival (Claremont Showgrounds, 2018)
- Q and A Session (Pilgrim Primary school SA via Skype, 2017)
- [Q and A Session](#) (Penguin District School, TAS via Skype, 2017)
- [School Science Club Presentation: “From Plasma to Planets: How the Universe formed Structures out of Soup”](#) (Perth Modern School, 2017)
- [CAASTRO in the Classroom Lecture: “Special Relativity”](#) (Aurora College, NSW via Skype, 2017)
- [CAASTRO in the Classroom Lecture: “Special Relativity”](#) (NSW Schools via Skype, 2016)

Industry and Inter-disciplinary Engagement

2016 – Present

- **ASU: 21cmSense:** A web-app for computing 21cm array sensitivities (2021 – 2022). *Successful proposal for and supervision of Software Engineering Capstone project team to work on web development of 21cmSense.*

- **ASU:** TheHaloMod: An Online Calculator for the halo model (2020 – 2021). *Successful proposal for and supervision of Software Engineering Capstone project team to work on web development of my site TheHaloMod.*
- **WesCEF:** Spectroscopy for soil nutrient analysis (17/04/2018 – 17/04/2018). *Consulting on data analysis of spectroscopic measurements of crops to diagnose soil nutrient issues.*
- **Atlassian:** Atlassian ShipIT Hackathon (08/09/2016 – 09/09/2016). *Hackathon dedicated to shipping new and novel ideas in 24 hours.*

Professional Training

2013 – Present

- Laboratory Safety Training (ASU) (Oct 2018)
- HDR Supervisor Induction (Feb 2017)
- MWA Data Reduction Workshop (May 2016)
- Code Testing for HPC (ASA Webinar Series) (Jul 2014)
- Bayesian Astronomy with R (Jul 2013)

Personal Training

2015 – Present

- Visual Communication for Scientists (Jul 2017)
- Stress Management and Resilience (Nov 2017)
- The Perfect Pitch (Nov 2017)
- Atlassian ShipIt Hackathon (5th place) (Jul 2016)
- Conversations at the Right Wavelength (Dec 2015)
- How to benefit from and contribute to Open Science (Dec 2015)
- Building Strong Leaders (Dec 2015)
- Creative Thinking in the Workplace (Dec 2015)
- ICRAR Media Training Workshop (Jul 2015)

AWARDS AND SCHOLARSHIPS

Scuola Normale Superiore

- Marie Curie Fellowship (2022, for 2 years)

ASU

- Accepted Proposal for ASU Soft. Eng. Capstone Project (2020, for 1 year)
- Accepted Proposal for ASU Soft. Eng. Capstone Project (2021, for 1 year)

Curtin

- Most Entertaining Talk at ICRAR-CON (2017)
- Most Scientifically Challenging Talk at ICRAR-CON (2017)
- Best Overall Talk, CAASTRO Retreat (2017)

UWA

- Ernest and Evelyn Shacklock Scholarship (2012, for 3 years)
- CAASTRO Student Talk Prize (2012)
- Most Exciting Talk at ICRAR-CON (2014)

ICRAR

- ICRAR/Pawsey Summer Internship (2011, for 10 weeks)

UQ

- UQ Excellence Scholarship (2007, for 3 years)
- Dean's Commendation for High Achievement (2007, for 3 years)

TECHNICAL SKILLS

Proficiency with Linux (Ubuntu and Arch) operating systems. Working knowledge of Windows and MacOS operating systems

Intimate knowledge of a variety of programming languages, in particular Python, Fortran and C, and to varying extents R, HTML, CSS, Javascript and SQL.

In-depth experience with matplotlib, numpy, scipy, emcee, emacs, git, GitHub, astropy, pyyaml and h5py programs and frameworks, and to varying extents django, plotly-dash, bokeh, pandas and regex.

PRESENTATIONS **Invited Talks**

1. “Overview of new 21cmFAST and 21cmMC” at Inaugural 21cmFAST Developers Workshop, Pisa, Italy (Sep 2019)
2. “[Improved Constraints on the X-Ray Heating of the IGM from HERA Phase I](#)” at Understanding the Epoch of Cosmic Reionization, Sesto, Italy (Oct 2023)
3. “Bayesian Insights for EDGES data” at URSI AT-AP-RASC, Gran Canaria, Canary Islands (May 2022)
4. “[An Update on the Progress of EDGES](#)” at URSI GASS, Rome, Italy (Aug 2021)

Seminars

1. “[Improved constraints on X-Ray Heating of the IGM From HERA](#)”, Scuola Normale Superiore (14/03/2023)
2. “[Forward Modelling Interferometric Observations of the EoR](#)”, Yale NPA Seminar (Virtual) (24/02/2022)
3. “[Building Confidence in Next-Generation 21cm Cosmology: A Forward-Model Approach](#)”, University of Melbourne (Virtual) (04/05/2021)
4. “[Building Confidence in Next-Generation 21cm Cosmology: A Forward-Model Approach](#)”, Imperial College London (Virtual) (19/05/2021)
5. “[Building Confidence in Next-Generation 21cm Cosmology: A Forward-Model Approach](#)”, Curtin University (Virtual) (22/09/2021)
6. “[An Update on the Progress of EDGES: The Hunt for Cosmic Dawn](#)”, Colorado University (Virtual) (24/09/2021)

Contributed Talks




1. “[Making EDGES Bayesian](#)” at Global 21cm Workshop, Montreal, Canada (Oct 2019)
2. “[Getting the Edge on the Wedge](#)” at ANITA Theory Workshop, Perth, Australia (Feb 2018)
3. “[Bridging the Great Divide: Connecting Physical Foregrounds with Interferometric Instruments](#)” at Rise and Shine, Strasbourg, France (Jun 2018)
4. “[Realistic Visibility Covariance for the EoR in the presence of... well, just about everything.](#)” at ANITA Theory Workshop, Hobart, Australia (Feb 2017)
5. “[Between Wedge and Window: An Improved Statistical Point-Source Foreground Model for the EoR](#)” at Fundamental Physics with the SKA, Flic-en-Flac, Mauritius (May 2017)
6. “[The Wedge and the Window](#)” at ICRAR CON, Mandurah, Australia (Sep 2017) [**Prize for Most scientifically challenging talk and Most entertaining talk**]
7. “[Between Wedge and Window: An Improved Statistical Point-Source Foreground Model for the EoR](#)” at Peering Towards Cosmic Dawn, Dubrovnik, Croatia (Oct 2017)

8. “[The Wedge and the Window](#)” at CAASTRO Annual Retreat, Adelaide, Australia (Nov 2017) [**Prize for Best overall talk**]
9. “[Eddington Bias vs. Hierarchical Bayes in the Halo Mass Function](#)” at Statistical Challenges in 21st Century Cosmology, Chania, Greece (May 2016)
10. “[A Simple Halo Mass Function Distribution](#)” at Diving into the Dark, Cairns, Australia (Jul 2016)
11. “[An Improved Statistical Foreground Model for the EoR](#)” at CAASTRO Annual Retreat, Busselton, Australia (Nov 2016)
12. “[Simplifying the Halo Mass Function](#)” at ICRAR CON, Rottnest Island, Australia (Sep 2015)
13. “[Tools and Statistics with Dark Matter Halos](#)” at ANITA Theory Workshop, Sydney, Australia (Feb 2014)
14. “[HALOgen](#)” at nIFTy Cosmology, Madrid, Spain (Jun 2014)
15. “[HALOgen: A Fast Approximate Halo Generator](#)” at ICRAR CON, Rottnest Island, Australia (Sep 2014) [**Prize for Most Exciting Talk**]
16. “[Dark Matters](#)” at CAASTRO Annual Retreat, Twin Waters, Australia (Nov 2014)
17. “The Generalised 2-Point Correlation Function” at ANITA Theory Workshop, Brisbane, Australia (Feb 2013)
18. “The Generalised 2-Point Correlation Function” at CAASTRO Annual Retreat, Pinnacles, Australia (Sep 2012) [**Prize for Best Student Talk**]
19. “[A Bayesian Calibration Framework for EDGES](#)” at Global 21cm Workshop, Berkeley, USA (Oct 2022)
20. “[An Update on the Progress of EDGES](#)” at Global 21cm Workshop, Boulder, USA (Oct 2021)
21. “[Current Status and Future Plans for EDGES](#)” at Next-Generation Cosmology with Next-Generation Radio Telescopes: II, Sesto, Italy (Jan 2020)
22. “[EDGES Calibration Pipeline](#)” at Global 21cm Workshop, Cambridge, UK (Oct 2020)





















PUBLICATIONS To see a configurable list of all my publications, see my ADS list¹. Information correct as of 24 Apr 2023. Any arxiv e-prints displayed have been accepted. Papers in each category listed in reverse chronological order. Papers with more than 5 citations per year highlighted in orange.

At a Glance

Total Papers	60	M-index	1.8
Normalized Papers	8.1	G-index	38
Total Citations	1492	I10-index	33
Total Norm. Citations	202.2	I100-index	2
H-index	20	Tori-index	2.8





Key:  Papers,  Citations,  Reads (on NASA ADS)

¹<https://ui.adsabs.harvard.edu/public-libraries/qfT0ZuGSRCWBI5sG0r15hw>

1. **Murray, Steven G.**, Bowman, Judd D., Sims, Peter H. et. al. (2022), *A Bayesian calibration framework for EDGES*, [MNRAS](#), **517**, 2264  3  45
2. **Murray, S. G.**, Diemer, B., Chen, Z. et. al. (2021), *THEHALOMOD: An online calculator for the halo model*, [A&C](#), **36**, 100487  13  72
3. **Murray, Steven**, Greig, Bradley, Mesinger, Andrei et. al. (2020), *21cmFAST v3: A Python-integrated C code for generating 3D realizations of the cosmic 21cm signal.*, [JOSS](#), **5**, 2582  41  32
4. **Murray, Steven**, Poulin, Francis (2019), *hankel: A Python library for performing simple and accurate Hankel transformations*, [JOSS](#), **4**, 1397  13  32
5. **Murray, S. G.**, Robotham, A. S. G., Power, C. (2018), *An Empirical Mass Function Distribution*, [ApJ](#), **855**, 5  2  14
6. **Murray, Steven G.**, Trott, C. M. (2018), *The Effect of Baseline Layouts on the Epoch of Reionization Foreground Wedge: A Semianalytical Approach*, [ApJ](#), **869**, 25  9  20
7. **Murray, Steven G.** (2018), *powerbox: A Python package for creating structured fields with isotropic power spectra*, [JOSS](#), **3**, 850  14  26
8. **Murray, S. G.**, Trott, C. M., Jordan, C. H. (2017), *An Improved Statistical Point-source Foreground Model for the Epoch of Reionization*, [ApJ](#), **845**, 7  20  10
9. **Murray, S. G.**, Power, C., Robotham, A. S. G. (2013), *HMFcalc: An online tool for calculating dark matter halo mass functions*, [A&C](#), **3**, 23  242  117
10. **Murray, S. G.**, Power, C., Robotham, A. S. G. (2013), *How well do we know the halo mass function ?*, [MNRAS](#), **434**, L61  44  14











Supervised papers by my students






















2 10 47

11. Nasirudin, Ainulnabilah, Prelogovic, David, **Murray, Steven G.** et. al. (2022), *Characterizing beam errors for radio interferometric observations of reionization*, [MNRAS](#), **514**, 4655  1  27
12. Nasirudin, A., **Murray, S. G.**, Trott, C. M. et. al. (2020), *The Impact of Realistic Foreground and Instrument Models on 21 cm Epoch of Reionization Experiments*, [ApJ](#), **893**, 118  9  20

Papers with significant contribution to analysis

21 302 615

13. Gorce, Adélie, Ganjam, Samskruthi, Liu, Adrian et. al. (2023), *Impact of instrument and data characteristics in the interferometric reconstruction of the 21 cm power spectrum*, [MNRAS](#), **520**, 375  2  76
14. Sims, Peter H., Bowman, Judd D., Mahesh, Nivedita et. al. (2023), *A Bayesian approach to modelling spectrometer data chromaticity corrected using beam factors - I. Mathematical formalism*, [MNRAS](#), **521**, 3273  2  59
15. Muñoz, Julian B., Qin, Yuxiang, Mesinger, Andrei et. al. (2022), *The impact of the first galaxies on cosmic dawn and reionization*, [MNRAS](#), **511**, 3657  36  82
16. Aguirre, James E., **Murray, Steven G.**, Pascua, Robert et. al. (2022), *Validation of the HERA Phase I Epoch of Reionization 21 cm Power Spectrum Software Pipeline*, [ApJ](#), **924**, 85  15  29
17. Prelogović, David, Mesinger, Andrei, **Murray, Steven** et. al. (2022), *Machine learning astrophysics from 21 cm lightcones: impact of network architectures and signal contamination*, [MNRAS](#), **509**, 3852  19  55





18. Trott, Cathryn M., Mondal, Rajesh, Mellema, Garreht et. al. (2022), *Multi-frequency angular power spectrum of the 21 cm signal from the Epoch of Reionisation using the Murchison Widefield Array*, [Astronomy and Astrophysics](#), 666, A106  2  34
19. Greig, Bradley, Wyithe, J. Stuart B., **Murray, Steven G.** et. al. (2022), *Generating extremely large-volume reionization simulations*, [MNRAS](#), 516, 5588  4  17
20. Mondal, Rajesh, Mellema, Garreht, **Murray, Steven G.**, Greig, Bradley (2022), *The multifrequency angular power spectrum in parameter studies of the cosmic 21-cm signal*, [MNRAS](#), 514, L31  5  34
21. Cox, Tyler A., Jacobs, Daniel C., **Murray, Steven G.** (2022), *Estimating the feasibility of 21cm-Ly synergies using the hydrogen Epoch of Reionization array*, [MNRAS](#), 512, 792  4  11
22. Kittiwisit, Piyanat, Bowman, Judd D., **Murray, Steven G.** et. al. (2022), *Measurements of one-point statistics in 21-cm intensity maps via foreground avoidance strategy*, [MNRAS](#), 517, 2138  0  35
23. Lanman, Adam E., **Murray, Steven G.**, Jacobs, Daniel C. (2022), *Validation Solutions to the Full-sky Radio Interferometry Measurement Equation for Diffuse Emission*, [The Astrophysical Journal Supplement Series](#), 259, 22  2  10
24. Gehlot, Bharat K., Jacobs, Daniel C., Bowman, Judd D. et. al. (2021), *Effects of model incompleteness on the drift-scan calibration of radio telescopes*, [MNRAS](#), 506, 4578  3  26
25. Chen, Zhaoting, Wolz, Laura, Spinelli, Marta, **Murray, Steven G.** (2021), *Extracting H I astrophysics from interferometric intensity mapping*, [MNRAS](#), 502, 5259  10  37
26. Wolz, L., **Murray, S. G.**, Blake, C., Wyithe, J. S. (2019), *Intensity mapping cross-correlations II: HI halo models including shot noise*, [MNRAS](#), 484, 1007  26  27
27. Trott, Cathryn M., Watkinson, Catherine A., Jordan, Christopher H. et. al. (2019), *Gridded and direct Epoch of Reionisation bispectrum estimates using the Murchison Widefield Array*, [PASA](#), 36, e023  20  11
28. Trott, Cathryn M., Fu, Shih Ching, **Murray, S. G.** et. al. (2019), *Robust statistics towards detection of the 21 cm signal from the Epoch of Reionization*, [MNRAS](#), 486, 5766  6  11
29. Meyers, B. W., Tremblay, S. E., Bhat, N. D. R. et. al. (2018), *Hunting for Radio Emission from the Intermittent Pulsar J1107-5907 at Low Frequencies*, [ApJ](#), 869, 134  16  14
30. Trott, Cathryn M., Jordan, C. H., **Murray, S. G.** et. al. (2018), *Assessment of Ionospheric Activity Tolerances for Epoch of Reionization Science with the Murchison Widefield Array*, [ApJ](#), 867, 15  20  0
31. Obreschkow, D., **Murray, S. G.**, Robotham, A. S. G., Westmeier, T. (2018), *Eddington's demon: inferring galaxy mass functions and other distributions from uncertain data*, [MNRAS](#), 474, 5500  15  19
32. Jordan, C. H., **Murray, S.**, Trott, C. M. et. al. (2017), *Characterization of the ionosphere above the Murchison Radio Observatory using the Murchison Widefield Array*, [MNRAS](#), 471, 3974  46  11
33. Avila, Santiago, **Murray, Steven G.**, Knebe, Alexander et. al. (2015), *HALO-GEN: a tool for fast generation of mock halo catalogues*, [MNRAS](#), 450, 1856  49  17

34. Wilensky, Michael J., Kennedy, Fraser, Bull, Philip et. al. (2023), *Bayesian jack-knife tests with a small number of subsets: application to HERA 21 cm power spectrum upper limits*, [MNRAS](#), 518, 6041  2  48
35. Abdurashidova, Zara, Aguirre, James E., Alexander, Paul et. al. (2022), *HERA Phase I Limits on the Cosmic 21 cm Signal: Constraints on Astrophysics and Cosmology during the Epoch of Reionization*, [ApJ](#), 924, 51  49  108
36. Abdurashidova, Zara, Aguirre, James E., Alexander, Paul et. al. (2022), *First Results from HERA Phase I: Upper Limits on the Epoch of Reionization 21 cm Power Spectrum*, [ApJ](#), 925, 221  75  84
37. Xu, Zhilei, Hewitt, Jacqueline N., Chen, Kai-Feng et. al. (2022), *Direct Optimal Mapping for 21 cm Cosmology: A Demonstration with the Hydrogen Epoch of Reionization Array*, [ApJ](#), 938, 128  3  39
38. Storer, Dara, Dillon, Joshua S., Jacobs, Daniel C. et. al. (2022), *Automated Detection of Antenna Malfunctions in Large-N Interferometers: A Case Study With the Hydrogen Epoch of Reionization Array*, [Radio Science](#), 57, e2021RS007376  3  26
39. Rogers, Alan E. E., Barrett, John P., Bowman, Judd D. et. al. (2022), *Analytic Approximations of Scattering Effects on Beam Chromaticity in 21-cm Global Experiments*, [Radio Science](#), 57, e2022RS007558  1  21
40. Rahimi, M., Pindor, B., Line, J. L. B. et. al. (2021), *Epoch of reionization power spectrum limits from Murchison Widefield Array data targeted at EoR1 field*, [MNRAS](#), 508, 5954  15  19
41. Yoshiura, S., Pindor, B., Line, J. L. B. et. al. (2021), *A new MWA limit on the 21 cm power spectrum at redshifts 13-17*, [MNRAS](#), 505, 4775  22  32
42. Trott, C. M., Jordan, C. H., Line, J. L. B. et. al. (2021), *Constraining the 21 cm brightness temperature of the IGM at $z = 6.6$ around LAEs with the murchison widefield array*, [MNRAS](#), 507, 772  2  23
43. Tan, Jianrong, Liu, Adrian, Kern, Nicholas S. et. al. (2021), *Methods of Error Estimation for Delay Power Spectra in 21 cm Cosmology*, [The Astrophysical Journal Supplement Series](#), 255, 26  11  29
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