UNIVERSITY OF CAMBRIDGE · KICC · THE ROYAL SOCIETY · erc · DiRAC · UKRI

Will Handley

Gonville & Caius College
Cambridge, UK, CB2 1TA
+44 (0) 7718 622713
wh260@cam.ac.uk
www.willhandley.co.uk
January 13, 2024

Summary

willhandley.co.uk/CV

Cosmologist and statistician whose research programme weaves theory, observation & inference:
Nested sampling; Bayesian machine learning; cosmological model selection, parameter estimation & tension quantification; likelihood-free inference; early universe cosmology; CMB; 21cm; gravitational waves; exoplanets.

- Internationally recognised research programme which has been awarded over **£3.8m** over the past 4 years.
- Interdisciplinary research with technology transfer to industry, government & start-ups.
- 2 years experience lecturing fourth year Cambridge General Relativity & Bayesian inference courses.
- 6 years experience (co-)supervising 17 PhD students & 3 postdocs.
- 128 papers
- PhD begun in 2012

Education

2012–2016 **University of Cambridge**, *PhD Astrophysics*, Prof. A. Lasenby & Prof. M. Hobson

2008–2012 **University of Cambridge**, *MSci, MA: Natural Sciences*, Gonville & Caius College

2001–2008 **Alleyn's School**, *A levels, GCSEs*, London

Employment & Research

Oct 2020– **Royal Society University Research Fellow**, *Cavendish Lab*, University of Cambridge
Bayesian machine learning and tensions in cosmology

May 2021– **Teaching Fellow**, *Gonville & Caius College*, University of Cambridge

2017– **Chief Technical Officer**, *PolyChord Ltd*, polychord.co.uk

2021–2023 **Turing Fellow**, *Alan Turing Institute*

2016–2020 **Research fellow**, *Gonville & Caius College*, University of Cambridge
Funded by Gonville & Caius College and an STFC IPS grant.

Jul-Sep 2016 **Postdoctoral researcher**, *Prof. H. Peiris*, University College London
Searching for features in the primordial power spectrum.

2012–2016 **PhD Astrophysics**, *Prof. A. Lasenby & Prof. M. Hobson*, University of Cambridge
Kinetic initial conditions for inflation: Theory, observations & methods.

2011–2012 **Part III Dissertation**, *Prof. P. Alexander*, University of Cambridge
Investigating the origins of cosmic magnetism.

Summer 2011 **Summer Research Student**, *Prof. M. Faulkes & Dr. J. Spencer*, Imperial College
Folded spectrum full configuration interaction quantum Monte Carlo.

Summer 2011 **Summer Research Student**, *Dr. R. Blumenfeld*, University of Cambridge
Geometry and field equations of granular systems.

2010–2011 **Research Review**, *Prof. S. Gull*, University of Cambridge
Literature Survey of the Physics-Philosophy crossover field of measurement theory.

Summer 2010 **iGEM Team Physicist**, *Dr. J. Haseloff*, University of Cambridge
E-glowli 2010 iGEM team (placed in final 6) http://2010.igem.org/Team:Cambridge

Grants won (£3.8m)

£1.3m **ERC starting grant ⇒ UKRI frontier research**, *Resolving cosmological tensions with diverse data, novel theories and Bayesian machine learning* , Horizon Europe ERC STG 2021, invited for grant preparation, converted to UKRI frontier research guarantee
Start date: October 2024 willhandley.co.uk/ERC.pdf

£240k **Royal Society Enhancement**, *Next generation nested sampling for cosmological inference*

£170k **Royal Society Enhancement**, *Likelihood-free inference and Bayesian neural networks*

52MCPUh ≡ £520k **DiRAC Resource Allocation Committee 15th call 2023**, *New frontiers in particle cosmology*

30MCPUh ≡ £300k **DiRAC Resource Allocation Committee 13th call 2021**, *Next generation cosmological analysis with nested sampling*

£723k **Royal Society URF 2020**, *Bayesian machine learning and tensions in cosmology*

2MCPUh ≡ £20k **DiRAC directors discretionary award 2020**, *Bayesian model comparison of inflation and spatial curvature*

£225k **STFC IPS 2019**, *PolyChord and Bayesian sparse facial recognition*

£42k **STFC IAA 2018**, *PolyChord and Bayesian neural network facial recognition*

£25k **STFC IAA 2016**, *Interfacing PolyChord 2.0*

£15k **KICC Workshop 2023**, *GAMBIT at the KICC*

£15k **KICC Workshop 2019**, *AstroHackWeek 2019*

$6k **George Southgate Visiting Fellowship 2020**, *GAMBIT visit*

£2k **KICC visitors 2019**, *Likelihood free inference workshop*

£2k **KICC visitors 2017**, *Class and MontePython workshop*

£1.8k **Caius + Kavli**, *Summer 2019 student funding*

£1.5k **King's + Kavli**, *Summer 2018 student funding*

Awards & Prizes

Jul. 2022	Pacific Institute of Theoretical Physics visitor	*University of British Columbia*
Feb. 2020	George Southgate visiting Fellow	*University of Adelaide*
Jul. 2019	Guiseppe and Vanna Cocconi Prize (WMAP and Planck)	*EPS-HEPP Division*
Jun. 2018	Gruber Prize (Planck)	*Gruber Foundation*
Dec. 2013	Best presentation	*Cavendish grad. students conference*
Jun. 2012	Best theoretical part III project	*University of Cambridge*
	Physics prize	*Gonville & Caius College*
Summer 2011	Undergraduate Research Bursary	*Nuffield Foundation*
	UROP Studentship	*Imperial College*
Summer 2010	iGEM Studentship	*Wellcome Trust*
2009–12	Junior and Senior Scholarships	*Gonville & Caius College*

Current students & postdocs willhandley.co.uk/students

Postdoc	David Yallup	*2021-present*
PhD	Namu Kroupa	*2023-present*
	Metha Prathaban, Wei-Ning Deng, Sinah Legner	*2022-present*
	Adam Ormondroyd	*2021-present*
	George Carter, Kilian Scheutwinkel, Thomas Gessey-Jones	*2020-present*
Masters	Felicity Ibrahim, Sam Hewson, Patrick Lau, Nicolas Mediato Diaz, Tze Goh	*2023-present*

Previous students & postdocs

PhD

Dec 2023 **Ian Roque**, *EXCALIBRATE: Calibration for astrophysical experimentation*
co-supervised with Nima Razavi-Ghods

Jun 2023 **Harry Bevins**, *A Machine Learning-enhanced Toolbox for Bayesian 21-cm Data Analysis and Constraints on the Astrophysics of the Early Universe*
co-supervised with Eloy de Lera Acedo and Anastasia Fialkov

Jul 2022 **Dominic Anstey**, *Data Analysis in Global 21cm Experiments: Physically Motivated Bayesian Modelling Techniques*
co-supervised with Eloy de Lera Acedo

Sep 2021 **Fruzsina Agocs**, *Primordial evolution of cosmological perturbations: Theory and computation*
co-supervised with Mike Hobson & Anthony Lasenby

Aug 2021 **Will Barker**, *Gauge Theories of Gravity*
co-supervised with Mike Hobson & Anthony Lasenby

Dec 2020 **Lukas Hergt**, *Constraining the kinetically dominated Universe*
co-supervised with Mike Hobson & Anthony Lasenby

Oct 2018 **Ed Higson**, *Bayesian Methods and machine Learning in Astrophysics*
co-supervised final year with Mike Hobson & Anthony Lasenby

Individual projects Thomas McAloone (2020-21), Isidro Gómez Vargas (2020), Ayngaran Thavenesan (2021-22)

MPhil

Sep 2023 **Danielle Dineen**, *Cosmological Matching Conditions for Primordial Perturbations*

Jan 2023 **Allahyar Sahibzada**, *Machine Learning and Nested Sampling: in the context of data intensive science and cosmology*

Nov 2022 **Sam Leeney**, *Data science in early universe Cosmology: a novel Bayesian RFI mitigation approach using numerical sampling techniques*
co-supervised with Eloy de Lera Acedo

Aug 2020 **Emma Shen**, *Ionospheric Effects in the Global 21-cm Experiment*
co-supervised with Eloy de Lera Acedo & Anastasia Fialkov

Aug 2019 **Ian Roque**, *Bayesian Techniques for the Calibration of 21 cm Global Experiments*
co-supervised with Nima Razavi-Ghods

Aug 2018 **Panagiotis Mavrogiannis**, *Wheeler–Feynman absorber theory of radiation: Establishing the cosmological electrodynamic arrow of time*
co-supervised with Anthony Lasenby

MSci

2023 Zixiao Hu, Cole Meldorf, Sankalan Bhattacharyyan, Toby Lovick

2022 Yoann Launay, Oliver Normand, Xy Wang, Carola Zanoletti

2021 Yi Jer Loh, Metha Prathaban

2020 Thomas Gessey-Jones, Aleks Petrosyan

2019 Deaglan Bartlet, Jamie Bamber, Ian Roque

2018 Ward Haddadin, Jessica Rigley

2017 Fruzsina Agocs, Robert Knighton, Stephen Pickman, Daniel Manela

Summer students

2023 Zixiao Hu, Toby Lovick, Namu Kroupa

2022 Mary Letey, Beichen Xu, Artyom Baryshnikov

2021 Zak Shumaylov, Mattia Varrone

2019 Denis Werth, Maxime Jabarian, Liam Lau

2018 Elizabeth Guest, Ward Haddadin, Shu-Fan Chen

Postdocs

2020 Jianghui Lui

2018-19 Kamran Javid

Lecturing

2021-2023 Part III Physics: Relativistic Astrophysics & Cosmology *MSci 24 lecture course*

2017-2021 Bayesian Statistics *Graduate 2 lecture course*

Workshops

2023 **Monte Carlo Methods**, *For Cosmology and Particle Physics*, UNAM, Mexico
github.com/handley-lab/workshop-monte-carlo-methods

2022 **ICCS**, *Training Machine Learning models*, Cambridge, UK
github.com/handley-lab/2022-cambridge-iccs

2018 **CosmoTools**, *Introduction to Statistics*, Aachen, Germany
indico.cern.ch/e/CosmoTools2018

2017 **CosmoTools**, *Cosmological statistics & sampling*, IFT Madrid, Spain
workshops.ift.uam-csic.es/cosmotools2017

Small group teaching

2020–present Part III Physics: Relativistic Astrophysics and Cosmology *Supervising (24 hours)*

2013–present Part II Physics: General relativity *Supervising (156 hours)*

2023–present Part II Physics: Statistical Mechanics *Supervising (28 hours)*

2012–2017 Part IA Mathematics for NatSci *Tripos classes (20 hours),Supervising (580 hours)*

2015-2016 Part IA Physics *Supervising (20 hours)*

2013 Part II Theoretical Physics 1 & 2 *Demonstrating (8 hours)*

2006–2012 Maths and Science Tuition *Individual coaching, key stage 1 – STEP*

Academic Talks willhandley.co.uk/talks † = remote

Jan. 2024 **Simulation Based Inference: theory, sampling & model comparison**, *RAS*, London, UK

Dec. 2023 **Nested sampling: powering next-generation inference and machine learning tools for cosmology, particle physics and beyond**, *UNAM*, Mexico City, Mexico

Nov. 2023 **Bayesian OODA loops with MIDAS: Augmented decision making in a complex future electromagnetic environment**, *OFEME 2023*, Nottingham, UK

Oct. 2023 **unimpeded: Universal model comparison and parameter estimation distributed over every dataset**, *Oscar Klein Center*, Stockholm, Sweden

Oct. 2023 **Nested sampling: powering next-generation inference and machine learning tools for cosmology, particle physics and beyond** , *Manchester*, UK

Sep. 2023 **Nested sampling tools**, *REACH AGM*, Malta

Sep. 2023 **Nested sampling: powering next-generation inference and machine learning tools for cosmology, particle physics and beyond** , *UCL*, UK

Aug. 2023 **Nested sampling: powering next-generation inference and machine learning tools for cosmology, particle physics and beyond** , *KCL*, UK

Jul. 2023 **The scaling frontier of nested sampling: Summary talk**, *MaxEnt*, Munich, Germany

Jun. 2023 **Gradients and Nested Sampling: the present state of the art**, *MIAPbP*, Munich, Germany

Mar. 2023 **Nested Sampling: A multi-purpose numerical tool for science and machine learning**, ETH Zurich, Switzerland

Jan. 2023 **High dimensional nested sampling**, *Simulation based inference with swyft*, Amsterdam, Netherlands

Jan. 2023 **What is the benefit of adversarial systems?**, *Mathematical Challenges in the Electromagnetic Environment*, London, UK

Dec. 2022 **Theory, observation & cosmological inference**, *KICC christmas*, Cambridge, UK

Sep. 2022 **Next generation cosmological analysis with nested sampling**, *KICC Symposium*, Cambridge, UK

Sep. 2022 **Next generation cosmological analysis with nested sampling**, *Corfu2022: Tensions in Cosmology*, Corfu, Greece

Aug. 2022 **Dark matter, cosmology and likelihood-free Inference**, *GAMBIT XIV*, Kelowna, Canada

Jul. 2022 **Nested Sampling: An efficient and robust Bayesian inference tool for particle physics and cosmology** , *TRIUMF & UBC*, Vancouver, Canada

Jul. 2022 **Frontiers of Nested Sampling**, *MaxEnt 2022*, Paris, France

Apr. 2022 **Nested Sampling and Likelihood-free inference**, *Likelihood-free in Paris*, Paris, France

Apr. 2022 **Statistical methods in Cosmology**, *Obs. and Theor. 21-cm Cosmology*, Cambridge, UK

Jan. 2022 **PolyChord: Next generation nested sampling**, *UK Atomic Energy Authority*, UK†

Nov. 2021 **Review on Statistical Tools and Samplers**, *TOOLS 2021*, IP2I, Lyon, France†

Jul. 2021 **Success Story 2 — Optimum Sensor Placement**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK

Jul. 2021 **Success Story 1 — Detecting Illicit Mesh Networks**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK

Mar. 2021 **PolyChord: Novel Bayesian Machine Learning**, *Cambridge Data Science Fair*, UK†

Feb. 2021 **Bayesian methods for quantifying global parameter tensions between cosmological datasets**, *Tehran meeting on cosmology at the crossroads*, Tehran, Iran†

Jan. 2021 **Bayesian information fusion**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK†

Oct. 2020 **Nested Sampling: an efficient and robust Bayesian inference tool for 21cm cosmology**, *3rd Global 21-cm Workshop*, Cambridge, UK†

Sep. 2020 **Nested Sampling for optimising sensor location**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK†

Feb. 2020 **Nested Sampling: an efficient and robust Bayesian inference tool for physics and machine learning**, *Physics Colloquium*, Adelaide, Australia

Jan. 2020 **Nested Sampling: an efficient and robust Bayesian inference tool for astrophysics and cosmology**, Oxford, UK

Jan. 2020 **PolyChord: next generation nested sampling**, *Mathematical Challenges in the Electromagnetic Environment*, Isaac Newton Institute, Cambridge, UK

Dec. 2019 **Quantised primordial power spectra**, *Texas 2019*, Portsmouth, UK

Nov. 2019 **Nested Sampling: an efficient and robust Bayesian inference tool for Machine Learning and Data Science**, *CDT talk*, Cambridge, UK

Aug. 2019 **Curvature tension: evidence for a closed universe(?)**, ICG Portsmouth, UK

Jul. 2019 **Quantifying cosmological tensions**, University College London, UK

Jun. 2019 **Likelihood free inference**, *GAMBIT X*, Germany

Mar. 2019 **Compromise-free Bayesian sparse reconstruction**, *LFI workshop*, Flatiron institute, US

Dec. 2018 **Inflation, curvature and kinetic dominance**, *Future uses of Planck data*, ESAC, Spain

Nov. 2018 **BAMBI Resurrection: Blind Accelerated Multimodal Bayesian Inference**, *Dark Machines*, Worldwide†

Nov. 2018 **Nested Sampling: an efficient and robust Bayesian inference tool for cosmology and particle physics**, *Dark Machines*, Worldwide†

Oct. 2018 **Bayesian Statistics**, *Third Asterics-Obelics workshop*, Cambridge, UK

May. 2018 **Planck, inflation and the future of inflationary constraints**, *Consistency of Cosmological Datasets*, Cambridge, UK

May. 2018 **MaxEnt priors with derived parameters in a specified distribution**, Cambridge, UK

May. 2018 **Nested Sampling: an efficient and robust Bayesian inference tool for astrophysics and cosmology**, ICIC, UK

April. 2018 **Introduction to statistics**, *CosmoTools 18*, RWTH Aachen, Germany

Jan. 2018 **Advances in Nested Sampling & astrophysical application**, Cambridge, UK

Aug. 2017 **PolyChord 2.0: Fast inference & nested sampling**, *Cosmo17*, Paris, France

Jun. 2017 **Modern Bayesian Inference: Theory and Practice**, RWTH Aachen, Germany

Mar. 2017 **Parameter estimation and Model comparison**, *CosmoTools 17*, Madrid, Spain

Feb. 2017 **PolyChord 2.0: Advances in Nested Sampling & astrophysical application**, Flatiron institute, US

Sep. 2016 **PolyChord 2.0 & the future of nested sampling**, University College London, UK

May. 2016 **PolyChord 2.0 & the future of nested sampling**, University of Sussex, UK

Mar. 2016 **PolyChord & the future of nested sampling**, Edinburgh, UK

Dec. 2015 **PolyChord: next generation nested sampling**, *MPA Bayes Forum*, Munich, Germany

Feb. 2015 **PolyChord: next generation nested sampling**, University of Sussex, UK

Dec. 2013 **Kinetic dominance in the pre-inflationary universe**, Cavendish grad. conference

Selected Outreach

Over the course of my career I have given 19 public outreach talks including:

May 2015 **Intro. to Astronomy: Beyond the Milky Way**, *IoA Public Talk*, Cambridge

May 2015 **To infinity and beyond: Dark Energy**, *Pint of Science*, Cambridge Brewhouse

Feb 2014 **The Physics of Juggling**, *CCPE*, Cavendish Laboratory

Jan 2014 **The first 3 yocto-pico seconds**, *Three minute wonder*, Cavendish Laboratory

Institutional responsibilities

2020–present	Convener of CosmoBit	*GAMBIT*
2020–present	Leader of data analysis team	*REACH*
2021–present	Center for data-driven discovery (C2D3) steering committee	*University of Cambridge*
2022–present	KICC Scientific Strategy Committee	*KICC*
2022–present	KICC Visitor and Lecturer committee	*KICC*
2018–present	Science Research Fellowships committee	*Gonville & Caius college*
2018–present	Investments committee	*Gonville & Caius college*
2016–present	Undergraduate Admissions	*Gonville & Caius college*
2020–present	Wine Committee	*Gonville & Caius college*
2019–2022	Gonville & Caius College Council	*Gonville & Caius college*
2021–2023	CDT in data intensive science executive committee	*University of Cambridge*

2018–2020	Education and research committee	*Gonville & Caius college*
2017–2022	Organiser of weekly group seminars	*Cavendish astrophysics group*

Examination

2021–2023 **Exam setting**, *Relativistic Astrophysics and Cosmology*, Part III Physics

2020–2022 **Masters exam checking**, *Astrostatistics*, Part III Maths

PhD

Dec 2023 **Lester Sandles**, *Star-forming Galaxies and Quenched Systems throughout Cosmic Time*

Dec 2021 **Wu Hyun Sohn**, *High-resolution CMB bispectrum estimator*

MPhil

Sep 2020 **Kyriakos Stylianiopoulos**, *Machine Learning Applied to Gaia and Other Survey Data: Applications Supporting a Polarisation Survey*

Organisation of scientific meetings

2023	GAMBIT at the KICC	*KICC*
2023	Frontiers of nested sampling	*Munich*
2023	Simulation based inference workshop (delayed from 2019)	*KICC*
2020	Scientific organising committee member of 3rd Global 21-cm Workshop	*KICC*
2019	Local organising committee member of KICC 10th anniversary symposium	*KICC*
2019	Helped secure funding and organised AstroHack week 2019	*KICC*
2018	Secured funding for and organised CLASS+MontePython software workshop	*KICC*

Peer review

Performed 78 reviews for journals including Physical Review D and Physical Review Letters;
`https://www.webofscience.com/wos/author/record/S-9134-2018`
PRD (34), MNRAS (7), JCAP (8), PRL (8), JOSS (2), APJ (2), EPJC (1), PLB (6), RASTI (2) Entropy (4), Astronomy & Computing (2), Physics of the Dark Universe (2)

Review for fellowship awards:

2022 C2D3 Early Career Researcher Seed Fund

2022 ABTA UK Doctoral Research Award

2022 Blavatnik fellowship

2021– Gonville & Caius Junior Research Fellowships

Collaborations

2018–present	REACH	*astro.phy.cam.ac.uk/research/research-projects/reach*
2018–present	GAMBIT	*gambit.hepforge.org*
2018–2020	DarkMachines	*darkmachines.org*
2017–2018	Terra Hunter Experiment	*terrahunting.org*
2016–2017	CORE	*core-mission.org*
2015–2016	AMI	*astro.phy.cam.ac.uk/research/research-projects/AMI*
2015–2019	Planck	*cosmos.esa.int/web/planck*

Software

willhandley.co.uk/software

PolyChord Sole author and maintainer: github.com/PolyChord/PolyChordLite

anesthetic Principle author and maintainer: github.com/handley-lab/anesthetic

lsbi	Principle author and maintainer: github.com/handley-lab/lsbi
unimpeded	Principle author and maintainer: github.com/handley-lab/unimpeded
fgivenx	Sole author and maintainer: github.com/handley-lab/fgivenx
pyBAMBI	Team maintainer: github.com/DarkMachines/pyBAMBI
MultiNest	Maintainer: github.com/farhanferoz/MultiNest
primordial	Sole author and maintainer: github.com/williamjameshandley/primordial
ModeCode	Maintainer: modecode.org
Open source	scipy: Weighted kernel density estimation in scipy.stats.gaussian_kde
	matplotlib: Vertical slider in matplotlib.widgets.Slider

Interaction with industry

PolyChord	Founded start-up company PolyChord Ltd. to bring Bayesian methods & tools from cosmology to Machine Learning & Biotech industries: polychord.co.uk
Shell	Work with department postdocs in the department applying nested sampling to geophysics
DSTL	Consult for government defence research using Bayesian inference
CMAM	Consult for finance spin-out on Bayesian algorithmic trading
AnyVision	Worked collaboratively as part of STFC grant to apply Bayesian sparse reconstruction to facial recognition

In the media

2022 **Cavendish Laboratory News**, *What can astrophysical data-intensive science do beyond the Universe?*, PolyChord, the next generation optimisation technology
https://www.phy.cam.ac.uk/news/what-can-astrophysical-data-intensive-science-do-beyond-universe-polychord-next-generation

2022 **BBC Radio 4**, *The Third Degree*, Astrophysics Don
"Students vs Dons" BBC radio quiz aired July 2022

2020 **Quanta Magazine**, *Modified gravity in cosmology led by Will Barker*
quantamagazine.org/why-is-the-universe-expanding-so-fast-20200427/

2022 **KICC annual report**, *Bringing astrostatistics back to Earth*
kicc.cam.ac.uk/aboutus/kicc-annual-reports

2019 **KICC annual report**, *Compromise-free Bayesian cosmology & AstroHack week*

Computer skills

Programming	MPI parallelisation, C++, FORTRAN, Mathematica, Maple, Python
Computing	Unix, Bash, zsh, vim, git, svn, LaTeX, Ti*k*Z, VMs, CI
OS	Arch Linux & HPC supercomputing (Experienced), Windows & OSX (Familiar)

References

Prof. Anthony Lasenby, +44 (0)1223 337293/4, a.n.lasenby@mrao.cam.ac.uk,
Prof. Mike Hobson, +44 (0)1223 339992, mph@mrao.cam.ac.uk
Prof. Ofer Lahav, +44 (0)203 5495813,o.lahav@ucl.ac.uk
Prof. Alan Heavens, +44 (0)207 5942930, a.heavens@imperial.ac.uk
Prof. Hiranya Peiris, +44 (0)203 5495831, h.peiris@ucl.ac.uk
Prof. Julien Lesgourgues, +49 241 80 25724, lesgourg@physik.rwth-aachen.de

Publications: arxiv.org/a/handley_w_1

First Author Publications

[1] **Will Handley** and Pablo Lemos. Quantifying the global parameter tensions between ACT, SPT, and Planck. *PRD*, 103(6):063529, March 2021.
[2] **Will Handley**. Curvature tension: Evidence for a closed universe. *PRD*, 103(4):L041301, February 2021.
[3] **Will Handley**. Primordial power spectra for curved inflating universes. *PRD*, 100(12):123517, July 2019.
[4] **Will Handley** and Pablo Lemos. Quantifying tensions in cosmological parameters: Interpreting the DES evidence ratio. *PRD*, 100(4):043504, August 2019.
[5] **Will Handley** and Pablo Lemos. Quantifying dimensionality: Bayesian cosmological model complexities. *PRD*, 100(2):023512, July 2019.
[6] **Will Handley**, Anthony Lasenby, and Mike Hobson. Logolinear series expansions with applications to primordial cosmology. *PRD*, 99(12):123512, June 2019.
[7] **Will Handley**. anesthetic: nested sampling visualisation. *JOSS*, 4:1414, May 2019.
[8] **Will Handley** and Marius Millea. Maximum-Entropy Priors with Derived Parameters in a Specified Distribution. *Entropy*, 21(3):272, March 2019.
[9] **Will J. Handley**, Anthony N. Lasenby, Hiranya V. Peiris, and Michael P. Hobson. Bayesian inflationary reconstructions from Planck 2018 data. *PRD*, 100(10):103511, November 2019.
[10] **Will Handley**. fgivenx: A Python package for functional posterior plotting. *JOSS*, 3(28):849, August 2018.
[11] **W. J. Handley**, A. N. Lasenby, and M. P. Hobson. Novel quantum initial conditions for inflation. *PRD*, 94(2):024041, July 2016.
[12] **W. J. Handley**, A. N. Lasenby, and M. P. Hobson. The Runge-Kutta-Wentzel-Kramers-Brillouin Method. *arXiv*, 1612.02288, December 2016.
[13] **W. J. Handley**, M. P. Hobson, and A. N. Lasenby. POLYCHORD: next-generation nested sampling. *MNRAS*, 453(4):4384–4398, November 2015.
[14] **W. J. Handley**, M. P. Hobson, and A. N. Lasenby. polychord: nested sampling for cosmology. *MNRAS*, 450:L61–L65, June 2015.
[15] **W. J. Handley**, S. D. Brechet, A. N. Lasenby, and M. P. Hobson. Kinetic initial conditions for inflation. *PRD*, 89(6):063505, March 2014.

Other publications

[16] H. T. J. Bevins, A. Fialkov, E. de Lera Acedo, **W. J. Handley**, S. Singh, R. Subrahmanyan, and R. Barkana. Astrophysical constraints from the SARAS 3 non-detection of the cosmic dawn sky-averaged 21-cm signal. *Nature Astronomy*, 6:1473–1483, December 2022.
[17] Greg Ashton, Noam Bernstein, Johannes Buchner, Xi Chen, Gábor Csányi, Andrew Fowlie, Farhan Feroz, Matthew Griffiths, **Will Handley**, Michael Habeck, Edward Higson, Michael Hobson, Anthony Lasenby, David Parkinson, Livia B. Pártay, Matthew Pitkin, Doris Schneider, Joshua S. Speagle, Leah South, John Veitch, Philipp Wacker, David J. Wales, and David Yallup. Nested sampling for physical scientists. *Nature Reviews Methods Primers*, 2:39, May 2022.
[18] REACH collaboration. The REACH radiometer for detecting the 21-cm hydrogen signal from redshift z $\approx$ 7.5-28. *Nature Astronomy*, 6:984–998, July 2022.
[19] Andrew Fowlie, Sebastian Hoof, and **Will Handley**. Nested Sampling for Frequentist Computation: Fast Estimation of Small p -Values. *PRL*, 128(2):021801, January 2022.
[20] Gong-Bo Zhao, Marco Raveri, Levon Pogosian, Yuting Wang, Robert G. Crittenden, **Will J. Handley**, and et al. Dynamical dark energy in light of the latest observations. *Nature Astronomy*, 1:627–632, August 2017.
[21] T. Gessey-Jones and **W. J. Handley**. Fully Bayesian Forecasts with Evidence Networks. *arXiv*, 2309.06942, September 2023.
[22] Harry Bevins and **Will Handley**. Piecewise Normalizing Flows. *arXiv*, 2305.02930, May 2023.
[23] David Yallup, **Will Handley**, Mike Hobson, Anthony Lasenby, and Pablo Lemos. Split personalities in Bayesian Neural Networks: the case for full marginalisation. *arXiv*, 2205.11151, May 2022.
[24] David Yallup, Timo Janßen, Steffen Schumann, and **Will Handley**. Exploring phase space with nested sampling. *European Physical Journal C*, 82(8):678, August 2022.
[25] David Yallup and **Will Handley**. Hunting for bumps in the margins. *Journal of Instrumentation*, 18(5):P05014, May 2023.
[26] Aleksandr Petrosyan and **William James Handley**. SuperNest: accelerated nested sampling applied to astrophysics and cosmology. *arXiv*, 2212.01760, December 2022.
[27] A. N. Lasenby, **W. J. Handley**, D. J. Bartlett, and C. S. Negreanu. Perturbations and the future conformal boundary. *PRD*, 105(8):083514, April 2022.
[28] D. J. Bartlett, **W. J. Handley**, and A. N. Lasenby. Improved cosmological fits with quantized primordial power spectra. *PRD*, 105(8):083515, April 2022.
[29] Metha Prathaban and **Will Handley**. Rescuing palindromic universes with improved recombination modeling. *PRD*, 105(12):123508, June 2022.
[30] Mary I. Letey, Zakhar Shumaylov, Fruzsina J. Agocs, **Will J. Handley**, Michael P. Hobson, and Anthony N. Lasenby. Quantum Initial Conditions for Curved Inflating Universes. *arXiv*, 2211.17248, November 2022.
[31] F. J. Agocs, M. P. Hobson, **W. J. Handley**, and A. N. Lasenby. Dense output for highly oscillatory numerical solutions. *arXiv*, 2007.05013, July 2020.
[32] F. J. Agocs, **W. J. Handley**, A. N. Lasenby, and M. P. Hobson. Efficient method for solving highly oscillatory ordinary differential equations with applications to physical systems. *Physical Review Research*, 2(1):013030, January 2020.

[33] F. J. Agocs, L. T. Hergt, **W. J. Handley**, A. N. Lasenby, and M. P. Hobson. Quantum initial conditions for inflation and canonical invariance. *PRD*, 102(2):023507, July 2020.
[34] L. T. Hergt, F. J. Agocs, **W. J. Handley**, M. P. Hobson, and A. N. Lasenby. Finite inflation in curved space. *PRD*, 106(6):063529, September 2022.
[35] L. T. Hergt, **W. J. Handley**, M. P. Hobson, and A. N. Lasenby. Bayesian evidence for the tensor-to-scalar ratio r and neutrino masses m_ν : Effects of uniform versus logarithmic priors. *PRD*, 103(12):123511, June 2021.
[36] L. T. Hergt, **W. J. Handley**, M. P. Hobson, and A. N. Lasenby. Case for kinetically dominated initial conditions for inflation. *PRD*, 100(2):023502, July 2019.
[37] L. T. Hergt, **W. J. Handley**, M. P. Hobson, and A. N. Lasenby. Constraining the kinetically dominated universe. *PRD*, 100(2):023501, July 2019.
[38] Ayngaran Thavanesan, Denis Werth, and **Will Handley**. Analytical approximations for curved primordial power spectra. *PRD*, 103(2):023519, January 2021.
[39] Zakhar Shumaylov and **Will Handley**. Primordial power spectra from k -inflation with curvature. *PRD*, 105(12):123532, June 2022.
[40] T. Gessey-Jones and **W. J. Handley**. Constraining quantum initial conditions before inflation. *PRD*, 104(6):063532, September 2021.
[41] Jamie Bamber and **Will Handley**. Beyond the Runge-Kutta-Wentzel-Kramers-Brillouin method. *PRD*, 101(4):043517, February 2020.
[42] W. I. J. Haddadin and **W. J. Handley**. Rapid numerical solutions for the Mukhanov-Sasaki equation. *PRD*, 103(12):123513, June 2021.
[43] W. E. V. Barker, A. N. Lasenby, M. P. Hobson, and **W. J. Handley**. Nonlinear Hamiltonian analysis of new quadratic torsion theories: Cases with curvature-free constraints. *PRD*, 104(8):084036, October 2021.
[44] W. E. V. Barker, A. N. Lasenby, M. P. Hobson, and **W. J. Handley**. Systematic study of background cosmology in unitary Poincaré gauge theories with application to emergent dark radiation and H_0 tension. *PRD*, 102(2):024048, July 2020.
[45] W. E. V. Barker, A. N. Lasenby, M. P. Hobson, and **W. J. Handley**. Mapping Poincaré gauge cosmology to Horndeski theory for emergent dark energy. *PRD*, 102(8):084002, October 2020.
[46] W. E. V. Barker, A. N. Lasenby, M. P. Hobson, and **W. J. Handley**. Static energetics in gravity. *JMAP*, 60(5):052504, May 2019.
[47] REACH collaboration. Radio Antenna Design for Sky-Averaged 21cm Cosmology Experiments: The REACH Case. *Journal of Astronomical Instrumentation*, 11(1):2250001–2058, January 2022.
[48] REACH collaboration. Receiver design for the REACH global 21-cm signal experiment. *arXiv*, 2307.00099, June 2023.
[49] Dominic Anstey, Eloy de Lera Acedo, and **Will Handley**. Use of time dependent data in Bayesian global 21-cm foreground and signal modelling. *MNRAS*, 520(1):850–865, March 2023.
[50] H. T. J. Bevins, E. de Lera Acedo, A. Fialkov, **W. J. Handley**, S. Singh, R. Subrahmanyan, and R. Barkana. A comprehensive Bayesian reanalysis of the SARAS2 data from the epoch of reionization. *MNRAS*, 513(3):4507–4526, July 2022.
[51] Harry Bevins, **Will Handley**, Pablo Lemos, Peter Sims, Eloy de Lera Acedo, and Anastasia Fialkov. Marginal Bayesian Statistics Using Masked Autoregressive Flows and Kernel Density Estimators with Examples in Cosmology. *arXiv*, 2207.11457, July 2022.
[52] Harry T. J. Bevins, **William J. Handley**, Pablo Lemos, Peter H. Sims, Eloy de Lera Acedo, Anastasia Fialkov, and Justin Alsing. Marginal post-processing of Bayesian inference products with normalizing flows and kernel density estimators. *MNRAS*, 526(3):4613–4626, December 2023.
[53] H. T. J. Bevins, **W. J. Handley**, A. Fialkov, E. de Lera Acedo, L. J. Greenhill, and D. C. Price. MAXSMOOTH: rapid maximally smooth function fitting with applications in Global 21-cm cosmology. *MNRAS*, 502(3):4405–4425, April 2021.
[54] H. T. J. Bevins, **W. J. Handley**, A. Fialkov, E. de Lera Acedo, and K. Javid. GLOBALEMU: a novel and robust approach for emulating the sky-averaged 21-cm signal from the cosmic dawn and epoch of reionization. *MNRAS*, 508(2):2923–2936, December 2021.
[55] Harry T. J. Bevins, Stefan Heimersheim, Irene Abril-Cabezas, Anastasia Fialkov, Eloy de Lera Acedo, **William Handley**, Saurabh Singh, and Rennan Barkana. Joint analysis constraints on the physics of the first galaxies with low-frequency radio astronomy data. *MNRAS*, 527(1):813–827, January 2024.
[56] K. H. Scheutwinkel, E. de Lera Acedo, and **W. Handley**. Bayesian evidence-driven diagnosis of instrumental systematics for sky-averaged 21-cm cosmology experiments. *PASA*, 39:e052, October 2022.
[57] K. H. Scheutwinkel, **W. Handley**, and E. de Lera Acedo. Bayesian evidence-driven likelihood selection for sky-averaged 21-cm signal extraction. *PASA*, 40:e016, April 2023.
[58] Emma Shen, Dominic Anstey, Eloy de Lera Acedo, Anastasia Fialkov, and **Will Handley**. Quantifying ionospheric effects on global 21-cm observations. *MNRAS*, 503(1):344–353, May 2021.
[59] I. L. V. Roque, **W. J. Handley**, and N. Razavi-Ghods. Bayesian noise wave calibration for 21-cm global experiments. *MNRAS*, 505(2):2638–2646, August 2021.
[60] Dominic Anstey, Eloy de Lera Acedo, and **Will Handley**. A general Bayesian framework for foreground modelling and chromaticity correction for global 21 cm experiments. *MNRAS*, 506(2):2041–2058, September 2021.
[61] Dominic Anstey, John Cumner, Eloy de Lera Acedo, and **Will Handley**. Informing antenna design for sky-averaged 21-cm experiments using a simulated Bayesian data analysis pipeline. *MNRAS*, 509(4):4679–4693, February 2022.

[62] T. Gessey-Jones, N. S. Sartorio, A. Fialkov, G. M. Mirouh, M. Magg, R. G. Izzard, E. de Lera Acedo, **W. J. Handley**, and R. Barkana. Impact of the primordial stellar initial mass function on the 21-cm signal. *MNRAS*, 516(1):841–860, October 2022.
[63] T. Gessey-Jones, A. Fialkov, E. de Lera Acedo, **W. J. Handley**, and R. Barkana. Signatures of cosmic ray heating in 21-cm observables. *MNRAS*, 526(3):4262–4284, December 2023.
[64] S. A. K. Leeney, **W. J. Handley**, and E. de Lera Acedo. Bayesian approach to radio frequency interference mitigation. *PRD*, 108(6):062006, September 2023.
[65] Michael Pagano, Peter Sims, Adrian Liu, Dominic Anstey, **Will Handley**, and Eloy de Lera Acedo. A general Bayesian framework to account for foreground map errors in global 21-cm experiments. *MNRAS*, 527(3):5649–5667, January 2024.
[66] Anchal Saxena, P. Daniel Meerburg, Eloy de Lera Acedo, **Will Handley**, and Léon V. E. Koopmans. Sky-averaged 21-cm signal extraction using multiple antennas with an SVD framework: the REACH case. *MNRAS*, 522(1):1022–1032, June 2023.
[67] A. N. Ormondroyd, **W. J. Handley**, M. P. Hobson, and A. N. Lasenby. Balancing ACT: weighing prior dependency and global tensions of DR6 lensing with other datasets. *arXiv*, 2310.08490, October 2023.
[68] D. D. Dineen and **W. J. Handley**. Analytic Approximations for the Primordial Power Spectrum with Israel Junction Conditions. *arXiv*, 2309.15984, September 2023.
[69] Namu Kroupa, David Yallup, **Will Handley**, and Michael Hobson. Kernel-, mean- and noise-marginalised Gaussian processes for exoplanet transits and H_0 inference. *arXiv*, 2311.04153, November 2023.
[70] Zixiao Hu, Artem Baryshnikov, and **Will Handley**. aeons: approximating the end of nested sampling. *arXiv*, 2312.00294, November 2023.
[71] Toby Lovick, Suhail Dhawan, and **Will Handley**. Non-Gaussian Likelihoods for Type Ia Supernovae Cosmology: Implications for Dark Energy and H_0. *arXiv*, 2312.02075, December 2023.
[72] Pablo Lemos, Nikolay Malkin, **Will Handley**, Yoshua Bengio, Yashar Hezaveh, and Laurence Perreault-Levasseur. Improving Gradient-guided Nested Sampling for Posterior Inference. *arXiv*, 2312.03911, December 2023.
[73] T. Gessey-Jones, S. Pochinda, H. T. J. Bevins, A. Fialkov, **W. J. Handley**, E. de Lera Acedo, S. Singh, and R. Barkana. On the Constraints on Superconducting Cosmic Strings from 21-cm Cosmology. *arXiv*, 2312.08828, December 2023.
[74] Margret Westerkamp, Jakob Roth, Philipp Frank, **Will Handley**, and Torsten Enßlin. Inferring Evidence from Nested Sampling Data via Information Field Theory. *arXiv*, 2312.11907, December 2023.
[75] Pablo Lemos, Fabian Köhlinger, **Will Handley**, Benjamin Joachimi, Lorne Whiteway, and Ofer Lahav. Quantifying Suspiciousness within correlated data sets. *MNRAS*, 496(4):4647–4653, August 2020.
[76] B. Joachimi, F. Köhlinger, **W. Handley**, and P. Lemos. When tension is just a fluctuation. How noisy data affect model comparison. *A&A*, 647:L5, March 2021.
[77] Gambit Collaboration. Thermal WIMPs and the scale of new physics: global fits of Dirac dark matter effective field theories. *European Physical Journal C*, 81(11):992, November 2021.
[78] Gambit Cosmology Workgroup. Strengthening the bound on the mass of the lightest neutrino with terrestrial and cosmological experiments. *PRD*, 103(12):123508, June 2021.
[79] Gambit Cosmology Workgroup. CosmoBit: a GAMBIT module for computing cosmological observables and likelihoods. *JCAP*, 2021(2):022, February 2021.
[80] Gambit Collaboration and et al. Simple and statistically sound recommendations for analysing physical theories. *Reports on Progress in Physics*, 85(5):052201, May 2022.
[81] Csaba Balázs, Sanjay Bloor, Tomás E. Gonzalo, **Will Handley**, Sebastian Hoof, Felix Kahlhoefer, Marie Lecroq, David J. E. Marsh, Janina J. Renk, Pat Scott, and Patrick Stöcker. Cosmological constraints on decaying axion-like particles: a global analysis. *JCAP*, 2022(12):027, December 2022.
[82] Andrew Fowlie, **Will Handley**, and Liangliang Su. Nested sampling with plateaus. *MNRAS*, 503(1):1199–1205, May 2021.
[83] Andrew Fowlie, **Will Handley**, and Liangliang Su. Nested sampling cross-checks using order statistics. *MNRAS*, 497(4):5256–5263, October 2020.
[84] Justin Alsing and **Will Handley**. Nested sampling with any prior you like. *MNRAS*, 505(1):L95–L99, July 2021.
[85] Kamran Javid, **Will Handley**, Mike Hobson, and Anthony Lasenby. Compromise-free Bayesian neural networks. *arXiv*, 2004.12211, April 2020.
[86] Edward Higson, **Will Handley**, Mike Hobson, and Anthony Lasenby. Dynamic nested sampling: an improved algorithm for parameter estimation and evidence calculation. *Statistics and Computing*, 29(5):891–913, September 2019.
[87] Edward Higson, **Will Handley**, Michael Hobson, and Anthony Lasenby. Bayesian sparse reconstruction: a brute-force approach to astronomical imaging and machine learning. *MNRAS*, 483(4):4828–4846, March 2019.
[88] Edward Higson, **Will Handley**, Michael Hobson, and Anthony Lasenby. NESTCHECK: diagnostic tests for nested sampling calculations. *MNRAS*, 483(2):2044–2056, February 2019.
[89] Edward Higson, **Will Handley**, Mike Hobson, and Anthony Lasenby. Sampling Errors in Nested Sampling Parameter Estimation. *Bayesian Analysis*, 13(3):873–896, March 2018.
[90] E. Ahrer, D. Queloz, V. M. Rajpaul, D. Ségransan, F. Bouchy, R. Hall, **W. Handley**, C. Lovis, M. Mayor, A. Mortier, F. Pepe, S. Thompson, S. Udry, and N. Unger. The HARPS search for southern extra-solar planets - XLV. Two Neptune mass planets orbiting HD 13808: a study of stellar activity modelling's impact on planet detection. *MNRAS*, 503(1):1248–1263, May 2021.

[91] F. Lienhard, D. Queloz, M. Gillon, A. Burdanov, L. Delrez, E. Ducrot, **W. Handley**, E. Jehin, C. A. Murray, A. H. M. J. Triaud, E. Gillen, A. Mortier, and B. V. Rackham. Global analysis of the TRAPPIST Ultra-Cool Dwarf Transit Survey. *MNRAS*, 497(3):3790–3808, September 2020.
[92] Richard D. Hall, Samantha J. Thompson, **Will Handley**, and Didier Queloz. On the Feasibility of Intense Radial Velocity Surveys for Earth-Twin Discoveries. *MNRAS*, 479(3):2968–2987, September 2018.
[93] DarkMachines High Dimensional Sampling Group. A comparison of optimisation algorithms for high-dimensional particle and astrophysics applications. *Journal of High Energy Physics*, 2021(5):108, May 2021.
[94] Ethan Carragher, **Will Handley**, Daniel Murnane, Peter Stangl, Wei Su, Martin White, and Anthony G. Williams. Convergent Bayesian global fits of 4D composite Higgs models. *Journal of High Energy Physics*, 2021(5):237, May 2021.
[95] A. J. K. Chua, S. Hee, **W. J. Handley**, E. Higson, C. J. Moore, J. R. Gair, M. P. Hobson, and A. N. Lasenby. Towards a framework for testing general relativity with extreme-mass-ratio-inspiral observations. *MNRAS*, 478(1):28–40, July 2018.
[96] S. Hee, J. A. Vázquez, **W. J. Handley**, M. P. Hobson, and A. N. Lasenby. Constraining the dark energy equation of state using Bayes theorem and the Kullback-Leibler divergence. *MNRAS*, 466(1):369–377, April 2017.
[97] S. Hee, **W. J. Handley**, M. P. Hobson, and A. N. Lasenby. Bayesian model selection without evidences: application to the dark energy equation-of-state. *MNRAS*, 455(3):2461–2473, January 2016.
[98] Clare Rumsey, Malak Olamaie, Yvette C. Perrott, Helen R. Russell, Farhan Feroz, Keith J. B. Grainge, **Will J. Handley**, Michael P. Hobson, Richard D. E. Saunders, and Michel P. Schammel. AMI observations of 10 CLASH galaxy clusters: SZ and X-ray data used together to determine cluster dynamical states. *MNRAS*, 460(1):569–589, July 2016.
[99] James S. Spencer, Nick S. Blunt, Seonghoon Choi, Jiri Etrych, Maria-Andreea Filip, W. M. C. Foulkes, Ruth S. T. Franklin, **Will J. Handley**, Fionn D. Malone, Verena A. Neufeld, Roberto Di Remigio, Thomas W. Rogers, Charles J. C. Scott, James J. Shepherd, William A. Vigor, Joseph Weston, RuQing Xu, and Alex J. W. Thom. The HANDE-QMC project: open-source stochastic quantum chemistry from the ground state up. *Journal of Chemical Theory and Computation*, 15(3):1728–1742, January 2019.

CORE Collaboration

[100] Exploring cosmic origins with CORE: B-mode component separation. *JCAP*, 2018(4):023, April 2018.
[101] Exploring cosmic origins with CORE: Mitigation of systematic effects. *JCAP*, 2018(4):022, April 2018.
[102] Exploring cosmic origins with CORE: Effects of observer peculiar motion. *JCAP*, 2018(4):021, April 2018.
[103] Exploring cosmic origins with CORE: Extragalactic sources in cosmic microwave background maps. *JCAP*, 2018(4):020, April 2018.
[104] Exploring cosmic origins with CORE: Cluster science. *JCAP*, 2018(4):019, April 2018.
[105] Exploring cosmic origins with CORE: Gravitational lensing of the CMB. *JCAP*, 2018(4):018, April 2018.
[106] Exploring cosmic origins with CORE: Cosmological parameters. *JCAP*, 2018(4):017, April 2018.
[107] Exploring cosmic origins with CORE: Inflation. *JCAP*, 2018(4):016, April 2018.
[108] Exploring cosmic origins with CORE: The instrument. *JCAP*, 2018(4):015, April 2018.
[109] Exploring cosmic origins with CORE: Survey requirements and mission design. *JCAP*, 2018(4):014, April 2018.

Planck Collaboration

[110] Planck 2018 results. XII. Galactic astrophysics using polarized dust emission. *A&A*, 641:A12, September 2020.
[111] Planck 2018 results. XI. Polarized dust foregrounds. *A&A*, 641:A11, September 2020.
[112] Planck 2018 results. X. Constraints on inflation. *A&A*, 641:A10, September 2020.
[113] Planck 2018 results. IX. Constraints on primordial non-Gaussianity. *A&A*, 641:A9, September 2020.
[114] Planck 2018 results. VIII. Gravitational lensing. *A&A*, 641:A8, September 2020.
[115] Planck 2018 results. VII. Isotropy and statistics of the CMB. *A&A*, 641:A7, September 2020.
[116] Planck 2018 results. VI. Cosmological parameters. *A&A*, 641:A6, September 2020.
[117] Planck 2018 results. V. CMB power spectra and likelihoods. *A&A*, 641:A5, September 2020.
[118] Planck 2018 results. IV. Diffuse component separation. *A&A*, 641:A4, September 2020.
[119] Planck 2018 results. III. High Frequency Instrument data processing and frequency maps. *A&A*, 641:A3, September 2020.
[120] Planck 2018 results. II. Low Frequency Instrument data processing. *A&A*, 641:A2, September 2020.
[121] Planck 2018 results. I. Overview and the cosmological legacy of Planck. *A&A*, 641:A1, September 2020.
[122] Planck intermediate results. LVII. Joint Planck LFI and HFI data processing. *A&A*, 643:A42, November 2020.
[123] Planck intermediate results. LVI. Detection of the CMB dipole through modulation of the thermal Sunyaev-Zeldovich effect: Eppur si muove II. *A&A*, 644:A100, December 2020.
[124] Planck intermediate results. LV. Reliability and thermal properties of high-frequency sources in the Second Planck Catalogue of Compact Sources. *A&A*, 644:A99, December 2020.
[125] Planck intermediate results. LIV. The Planck multi-frequency catalogue of non-thermal sources. *A&A*, 619:A94, November 2018.
[126] Planck intermediate results. LIII. Detection of velocity dispersion from the kinetic Sunyaev-Zeldovich effect. *A&A*, 617:A48, September 2018.
[127] Planck 2015 results. XX. Constraints on inflation. *A&A*, 594:A20, September 2016.
[128] Planck 2015 results. I. Overview of products and scientific results. *A&A*, 594:A1, September 2016.