

<b>CONTACT</b>	Professor Yin-Zhe Ma (MASSAf) Department of Physics Stellenbosch University Room 1018, Merensky Building 111 Merriman Ave Matieland Western Cape, South Africa	Tel : +27 21 808 3372 Cell: +27 81 835 8122 Email-1: mayinzhe@sun.ac.za Email-2: mayinzhe.pi@gmail.com ORCID: 0000-0001-8108-0986 Google Scholar: <a href="https://tinyurl.com/3ptzxbj4">https://tinyurl.com/3ptzxbj4</a> URL: <a href="https://physics.sun.ac.za/astro/">https://physics.sun.ac.za/astro/</a>	
<b>EDUCATION</b>	<b>B.S.</b> in Physics, Nanjing University, China (Top 3% of the ranking)		2002-2006
	<b>M.S.</b> in Theoretical Physics, Chinese Academy of Sciences, China Advisors: Profs. Rong-Gen Cai (Academician) and Xuelei Chen		2006-2008
	<b>Ph.D.</b> in Astronomy, University of Cambridge, United Kingdom Institute of Astronomy (IoA) and Trinity College Cambridge Advisors: Profs. George Efstathiou F.R.S. and Anthony Challinor Thesis: Cosmology with CMB and Large-Scale Structure		2008-2011
<b>POSITIONS (MAJOR)</b>	<b>CITA National Fellow</b> , Department of Physics and Astronomy University of British Columbia, Vancouver, Canada		2011-2014
	<b>Research Associate</b> , Jodrell Bank Center for Astrophysics The University of Manchester, Manchester, United Kingdom		2014-2015
	<b>Senior Lecturer</b> , School of Chemistry and Physics		2015-2017
	<b>Associate Professor</b> , School of Chemistry and Physics		2018-2021
	<b>Full Professor</b> , School of Chemistry and Physics University of KwaZulu-Natal, Durban, South Africa		2021-2023
	<b>Full Professor &amp; (Founding) Head of Astrophysics Division</b> <b>Stellenbosch-Groningen Research Chair on Computational Astronomy</b> Department of Physics, Stellenbosch University, South Africa		2023- 2024-
<b>POSITIONS (ADJUNCT &amp; VISITING)</b>	Guest Research Professorship, Shanghai Astronomical Observatory		2015-2016
	Visiting Fellow, University of Manchester		2015-2019
	Senior Overseas Visiting Fellow, Tsinghua University		2018
	Adjunct Professor, Purple Mountain Observatory, China		2017-2022
	Adjunct Professor, National Astronomical Observatory of China		2019-2021
	Peng HuanWu Visiting Professorship, Institute of Theoretical Physics, CAS		2022
	Honorary Full Professor, University of KwaZulu-Natal		2023-2026
<b>BIBLIOGRAPHIC DATA</b>	<b>139</b> refereed publications ( <b>70</b> Leading and Corresponding authors) Total citation: <b>30631</b> (ADS/NASA; most accurate), <b>32971</b> (GoogleScholar) h-index: <b>47</b> (ADS/NASA), <b>54</b> (GoogleScholar) Post-PhD m-factor <b>3.0</b> (Distinguished individual in R1 University/Laboratory)		
<b>FELLOWSHIPS AND GRANTS</b>	PI, Cambridge Overseas Trust, Uni. of Cambridge (GBP 9k/yr for 3 yrs)		2008-2011
	PI, Rouse Ball/Eddington Fund, University of Cambridge (GBP 1000)		2009, 2010
	PI, CITA National Research Fellowship (CAD 52,500/yr for 3 yrs)		2011-2013
	PI, Postdoctoral Travel Award, University of British Columbia (CAD 1.5k)		2013
	PI, University of KwaZulu-Natal Start-Up funds (ZAR 500k)		2015
	PI, NRF/Knowledge, Interchange and Collaboration grant (ZAR 25k)		2016
	PI, NRF/South Africa-China bilateral workshop grant (ZAR 400k)		2016
	PI, University of KwaZulu-Natal Publication grant (~ZAR 180k/yr)		2016-2023
	PI, NRF/Competitive Support for Unrated Researcher (ZAR 618k/401k/459k)		2017-2019
	Co-I, South Africa-Switzerland Bilateral grant (ZAR 650k/yr for 5 yrs)		2017-2021
	PI, CAS/SKA Strategic Funding (CNY 800k/yr for 5 yrs)		2017-2021
	PI, NRF/Incentive Funding for Rated Researcher (ZAR 40k/yr for 5 yrs)		2017-2022
	PI, NRF/Blue Skies Concept Research Grant (ZAR 200k)		2018

<b>FELLOWSHIPS AND GRANTS cont.</b>	PI, NRF/BRICS Astrophysics Conference (ZAR 307k)	2018	
	PI, NSFC/Oversea Chinese scholar collaboration fund (CNY 180k)	2019-2020	
	Co-I, UKZN/Research Flagship project (ZAR 2,110k/yr for 3 yrs)	2019-2021	
	PI, NRF/South Africa-China flagship program (ZAR 500k/444k)	2020-2021	
	PI, NRF/Blue Skies Full Research Program (ZAR 820k/764k/445k)	2020-2022	
	PI, NRF/NITheCS Research Program for Cosmology (ZAR 386k)	2022	
	PI, CAS/Peng HuanWu Visiting Professorship (CNY 90k)	2022	
	PI, NRF/SARAO Group Research Grant (ZAR 536k/467k/467k)	2023-2025	
	PI, NRF/NITheCS Research Program for Cosmology (ZAR 250k)	2023	
	PI, NRF/Competitive Program for Rated Researcher (ZAR 432k/225k/336k)	2023-2025	
	PI, NRF/Incentive Funding for Rated Researchers (ZAR 50k)	2024	
	PI, Stellenbosch University Establishment Fund (ZAR 1500k)	2024-2026	
	PI, NRF/MOST Joint Research Program (ZAR 300k)	2024-2025	
	PI, NRF/European Research Council (ERC) Partnership (ZAR 150k)	2024-2025	
	PI, Stellenbosch University Subcommittee-B Fund (ZAR 240k)	2024-2025	
	<p>“NRF”-National Research Foundation of South Africa; “SARAO”-South Africa Radio Astronomy Observatory; “NSFC”-National Science Foundation of China; “CAS”-Chinese Academy of Sciences</p> <p>“GBP”-British Pounds (£); “CNY”-Chinese Yuan (¥), “ZAR”-South Africa Rands (R); “CAD”-Canadian dollars (C\$)</p>		
	<b>AWARDS AND HONORS</b>	Guang-Hua Scholarship, Nanjing University (CNY 1,000)	2003
Yao-Liang Elite Scholarship, Nanjing University (CNY 8k)		2004	
-award to only 8 students for entire University undergrads			
First Class Scholarship (top 3% students), Nanjing University (CNY 3k)		2005	
Best Popular Science Article, “Nature and Sci& Tech” Magazine, China		2010	
Excellent Overseas Student, Ministry of Education of China (USD 5k)		2011	
-award to distinctive overseas Chinese students			
Grand Prize and Most Engaging Prize of 3-minute Competition, UBC		2012	
Most Engaging Speech, Graduate Union, University of British Columbia		2012	
National Research Foundation Researcher Rating			
-C1 (Established Researcher)		2017-2022	
-B3 (International Acclaimed Researcher)		2023-2028	
Gruber Cosmology Prize, The Peter and Patricia Gruber Foundation		2018	
-award to ESA Planck team which I am a core-team member			
Vice-Chancellor Research Award, UKZN (ZAR 15k)		2018	
-award to distinctive faculty member below age 40			
Elected as a <b>Member of Academy of Sciences of South Africa (MASSAf)</b>	2022		
-for distinguished research achievement and international impact			
UKZN Top 5 most cited researchers award	2022		
Elected to the Council of Royal Society of South Africa (RSSAf)	2022		
Elected as a Fellow of Royal Society of South Africa (FRSSAf)	2023		
<b>RESEARCH INTERESTS</b>	<b>Radio Astronomy:</b> 21-cm Intensity Mapping (single-dish and interferometer), Dark Matter searches, HI galaxy survey		
	<b>Cosmology:</b> Cosmic Microwave Background Radiation, Epoch of Reionization, Sunyaev-Zeldovich effect, Large-Scale Structure		
	<b>Multi-wavelength Astronomy:</b> Intergalactic and Circumgalactic Medium (IGM, CGM)		
<b>LEADERSHIP ROLE IN ASTRONOMY PROJECTS</b>	<b>Leadership Roles in Institutional Collaboration</b>		
	Chair of UKZN-NAOC Computational Astrophysics Centre	2016-2021	
	-establish strategic partnership with NAOC with joint postdoc program		
Stellenbosch-Groningen Research Chair on Computational Astronomy	2024-2029		
-establish strategic partnership with Kapteyn Astronomy Institute, and recruit 10 PhD students jointly supervised by the two sides			

**Leadership Roles in Astronomy Collaborations**

Planck satellite (International) core team member	2013-2019
–Co-leading kinetic Sunyaev-Zeldovich project and Inflation project	
Six-Degree-Field(6dF) and TAIPAN (Australia) galaxy survey	2013-2022
–Co-leading velocity field power spectrum project	
SKA <i>Cosmology, EoR</i> and <i>HI</i> Science Working Group member	2015-present
Hydrogen Epoch Reionization Array (HERA): “Builder”(Significant PI)	2018-present
–Leading Quasi-redundant Calibration and cross-correlation projects	
Rubin Observatory (Large Synoptic Survey Telescope) South Africa PI	2019-present
–involving in Dark Energy Science Collaboration team	
CMB-Stage 4 member	2021-present

**Leadership Roles in Telescope Proposals**

PI: FAST, <i>Filament between galaxy clusters</i> (3-hrs)	2019
PI: MeerKAT, <i>Searching for axion dark matter with MeerKAT</i> (10-hrs)	2021
I have also participated more than 10 proposals as Co-I.	

**RESEARCH SKILLS**

Programming: Fortran 90/77, C, Python, Parallel program, HPC, Mathematica, Maple  
 Software Package: Matlab, CAMB, CosmoMC, HEALPix, MultiNest, 21cmFAST  
 Statistical Tools: Bayesian Parameter estimation, Maximum Likelihood, Machine Learning

**ACADEMIC EDITORSHIP AND REFERESHIP****Journal Editor:**

Research in Astronomy and Astrophysics (IOPscience, IF: 1.8)	since 2019
Fundamental Research (ScienceDirect, IF: 6.2)	since 2024

**Journal Referee:**

Physica Scripta (IF: 1.194)	since 2011
Research in Astronomy and Astrophysics (IF:1.8)	since 2012
Journal of Cosmology and Astro-particle Physics (IF:4.734)	since 2013
Science China Physics, Mechanics and Astronomy (IF:2.237)	since 2014
Monthly Notices of the Royal Astronomical Society (IF:4.961)	since 2014
The Astrophysical Journal (IF:5.533)	since 2014
International Journal of Modern Physics D (IF:2.476)	since 2015
Progress in Astronomy (in Chinese)	since 2016
New Astronomy (IF:0.938)	since 2016
Nuclear Physics B (IF:3.678)	since 2017
Scientific Reports (IF:4.259)	since 2017
Physical Review D (IF: 4.4)	since 2019
Astrophysics and Space Science (IF: 1.89)	since 2020
International Journal of Modern Physics A (IF: 1.153)	since 2020
European Physical Journal C (IF: 4.843)	since 2020
Physical Review Letters (IF: 8.385)	since 2020
Physics of the Dark Universe (IF: 4.473)	since 2021
Communications Physics (Springer Nature, IF: 6.497)	since 2023

**Telescope Proposal Assessor:**

Giant Metrewave Radio Telescope (GMRT) proposal	since 2024
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**KEYNOTE/ INVITED TALKS IN CONFERENCES**

“Puzzles in Modern Cosmology”	
–China Overseas Postdoctoral Conference, Shanghai	2013
“Puzzles in Modern Cosmology”	
–“Intrinsic Decoherence in Nature” International conference, Vancouver	2013
“Anthropic Principle”	
–“Time and Life in the Universe” International panel, Peter Wall Inst. Canada	2013
“How much cosmological information can be measured?”	
–China-SA bilateral conference on radio astronomy, Guizhou/China	2017
“Cosmology Now”, High Energy Astrophysics in Southern Africa, Johannesburg/SA	2017

<b>KEYNOTE/ INVITED TALKS cont.</b>	<i>"Testing quantum effect with pulsar-BH system"</i>	
	–"Quantum Black Holes in the Sky" Conference, Perimeter Institute	2017
	<i>"Fundamental Physics with South Africa SKA"</i>	
	–SKA Annual conference, Shanghai	2018
	<i>"The kinematic Sunyaev-Zeldovich effect: New window for the Universe"</i>	
	–Cosmic Flows conference, Stellenbosch, South Africa	2020
	<i>"Cosmological uses of Fast Radio Bursts"</i>	
	–The 369th Symposium of IAU General Assembly, South Korea	2022
	<i>"Cosmology: A Golden Era"</i>	
	–African Astronomical Society (AfAS) Annual Meeting, South Africa	2023
<i>"An introduction to HERA and its current upper limits from Phase I observations"</i>		
–21-cm Cosmology Workshop, Shenyang, China	2023	
<i>"Machine Learning in Cosmology"</i>		
–Centre for High-Performance Computing Annual Conference, South Africa	2023	
<i>"Dark Matter in Radio Astronomy"</i> –Symposium on Science at PAUL	2024	

**CONFERENCES & COLLOQUIA** I have given more than 200 oral presentations in conferences and meetings. I have also given more than 100 invited seminars and colloquia in USA, United Kingdom, Germany, France, Belgium, Canada, Israel, South Korea, Australia, South Africa, Spain, India, Vietnam, Mauritius, Switzerland, Austria, Italy, Singapore, Malaysia, Hong Kong SAR of China, and mainland China.

<b>SUPERVISION</b>	<b>Completed Primary Supervision of Graduate Students</b>	
	Simon Mulokoshi (Honours, University of KwaZulu-Natal)	2016
	Floyd Asa (Honours, University of KwaZulu-Natal)	2017
	Nondumiso Khumalo (Honours, University of KwaZulu-Natal)	2018
	–moved to a masters program	
	Phumlani Phakathi (Honours & Masters, University of KwaZulu-Natal)	2016-2019
	–moved to do a PhD program	
	ZhenXing Fu (Masters, Purple Mountain Observatory)	2018-2020
	–one publication	
	–PMO Excellent Student (2020), USTC Outstanding graduate (2021)	
	Elimboto Yohana (PhD, University of KwaZulu-Natal)	2016-2019
	–two publications, moved to a lecturer at Dar Es Salaam University	
	Ayodeji Ibitoye (PhD, University of KwaZulu-Natal)	2017-2021
	–one publication, moved to a postdoc position	
	Mthokosizi Mdlalose (PhD, University of KwaZulu-Natal)	2018-2022
	–moved to a lecturer position	
	Tamirat Gobo (PhD, University of KwaZulu-Natal)	2019-2021
	–one publication, moved to a SKA postdoc position at UWC	
	Tashvir Sithapersad (Honours, University of KwaZulu-Natal)	2020
	–moved to a masters program	
	Yun-Fan Zhou (Masters, Purple Mountain Observatory)	2020-2022
	–two publications, went to do a PhD at NAOC/China	
	–PMO Excellent student (2020, 2021), PMO First-class student (2022)	
	Hong-Gang Yang (Masters, Purple Mountain Observatory, China)	2021-2023
	–moved to a PhD program at the University of Edinburgh	
	Gang Li (PhD, Purple Mountain Observatory, China)	2019-2023
	–moved to a Postdoc at Zhejiang University	
	Siyabonga Zungu (masters, University of KwaZulu-Natal)	2020-2023
	Chandan G. Nagarajappa (PhD, University of KwaZulu-Natal)	2019-2023
	Xin Tang (masters student, Purple Mountain Observatory, China)	2021-2024
–moved to a PhD program at the University of Sussex		
<b>Completed Co-Supervision of Graduate Students</b>		
Zhong-Liang Tuo (PhD, Institute of Theoretical Physics, Beijing)	2011-2013	
–one publication		
Bo Tang (PhD, Institute of Theoretical Physics, Beijing, one publication)	2011-2013	
Xiao-Dong Li (PhD, Institute of Theoretical Physics, Beijing)	2011-2013	
–two publications, moved to a postdoc position and then faculty		

<b>SUPERVISION cont.</b>	Cheng Cheng (PhD, Institute of Theoretical Physics, Beijing) –two publications, moved to a postdoc position	2011-2013
	Yang Liu (Master, Simon Fraser U), Master Thesis	2012-2013
	Michael Sitwell (PhD, U of British Columbia, one publication)	2012-2013
	Yue Liu (PhD, University of Massachusetts)	2013-2014
	Lucas Olivari (PhD, University of Manchester) –five publications, moved to a postdoc position at Sao Paulo	2014-2017
	Tianyue Chen (PhD, University of Manchester) –five publications, moved to a postdoc at MIT, EPFL, then staff	2015-2019
	Charles Walker (PhD, University of Manchester) –two publications, moved to a postdoc at Max Planck Inst., then staff	2015-2019
	Junsong Cang (PhD student, Institute of High-Energy Physics) –completed four publications –moved to a postdoc@Scuola Normale Superiore di Pisa	2018-2022

#### Current Primary Supervision of Graduate Students

Chang-Xiang Mao (PhD student, Purple Mountain Observatory, China)	2020-2024
Brandon Bisschoff (PhD student, University of KwaZulu-Natal)	2022-2026
Phillip Badenhorst (PhD student, Stellenbosch University)	2024-2026
Guifan Pan (PhD student, Stellenbosch University)	2024-2026

#### Mentoring Postdoctoral Fellows

Dr. Yi-Chao Li (University of KwaZulu-Natal) –(current) Associate Professor of Physics, North East Uni. of China	2016-2018
Dr. Di-Fu Shi (University of KwaZulu-Natal)	2017-2018
Dr. Cheng Cheng (Tsinghua University & University of KwaZulu-Natal) –(current) Full Research Professor at Xinjiang Observatory, China	2017-2021
Dr. Prabhkar Tiwari (National Astronomical Observatory China)	2017-2021
Dr. Denis Tramonte (University of KwaZulu-Natal & Purple Mountain Obs.) –(current) Assistant Professor at Xi'an JiaoTong-Liverpool Uni. (XJTLU)	2017-2022
Dr. Anthony Walters (University of KwaZulu-Natal)	2018-2020
Dr. Wei-Ming Dai (University of KwaZulu-Natal) –(current) Lecturer of Physics at Ningbo University, China	2018-2022
Dr. Piyanat Kittiwist (University of KwaZulu-Natal)	2019-2021
Dr. Yogesh Chandola (Purple Mountain Observatory China)	2019-2024
Dr. Hao Chen (Purple Mountain Observatory) –(current) Permanent Staff Scientist at Zhijiang Laboratory, China	2021
Dr. Guo-Jian Wang (U. of KwaZulu-Natal & Stellenbosch U.)	2021-2025
Dr. Ayodeji Ibitoye (University of KwaZulu-Natal)	2022-2023
Dr. Heba Abdulrahman (University of KwaZulu-Natal)	2022-2023
Dr. Michael Sarkis (Stellenbosch University)	2024-2025
Dr. Sheean Jolicoeur (Stellenbosch University)	2024-2025
Dr. Wen-Qing Guo (Stellenbosch University)	2024-2027

#### MENTORING OTHERS ON GRANT APPLICATION

#### Mentored masters and PhD students to obtain competitive scholarships

Mr. Elimboto Yohana, DAAD Scholarship, ZAR 130k/yr for 3 yrs	2016
Mr. Phumlani Phakathi, NASSP master bursary, ZAR 150k/yr for 2 yrs	2017
Mr. Mthokozisi Mdlalose –SKA Bursary, ZAR 200k/yr for 3 yrs	2018-2020
–UKZN Talent and Equity Scholarship, ZAR 150k	2021
Mr. Brandon Bisschoff –NITheP PhD bursary, ZAR 100k/yr for 3 yrs	2019
–EPFL 100 Africa PhD Program, 80k Swiss Francs for 5 yrs	2021
Ms. Nondumiso Khumalo, SAAO Masters bursary, ZAR 200k/yr for 2 yrs	2020-2021
Mr. Siyabonga Zungu, NASSP Masters bursary, ZAR 150k/yr for 2 yrs	2020-2021
Mr. Tashvir Sithapersad, NASSP Masters bursary, ZAR 150k/yr for 2 yrs	2020-2021
Miss. Victoria Nakafingo, SAAO Masters bursary, ZAR 218k/yr for 2 yrs	2024-2025

**Mentored postdoctoral fellows to obtain prestigious fellowship**

Dr. Denis Tramonte		
–South Africa Claude Leon Fellowship, ZAR 275k/yr for 2 years		2017
–CAS Presential International Fellowship, ZAR 250k/yr for 2 yrs		2021
–NSFC Research Fund for International Scholar, CNY 200k		2022
–Ministry of Sci. & Tech. China Foreign Expert grant, CNY 150k		2022
Dr. Yogesh Chandola		
–FAST Research Fellowship, CNY 200k/yr for 3 yrs		2019
–NSFC Research Fund for International Scholar, CNY 200k		2020
–Ministry of Sci. & Tech. China Foreign Expert grant, CNY 300k		2021
Dr. Anthony Walters		
–NRF Young Scientist Exchange Program, CNY 100k		2019
–NRF free-standing fellowship, ZAR 250k/yr for 2 yrs		2020
Dr. Zi-ang Yan		
–German Center for Cosmological Lensing Fellowship, EUR 50k/yr for 3 yrs		2020
Dr. Ayodeji Ibitoye		
–CAS/ANSO Fellowship for early career scientist, CNY 240k for 1 yr		2022

**TEACHING  
EXPERIENCE****Physics Honours Program Coordinator**

–coordinate the program including offering, student registration, project selection, advice of module, and individual consultation		2022-
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**Module Developer and Lecturer**

–develop the whole module, lecture, mark the tests and exams		
“Astrophysics” 4th-yr physics major at University of KwaZulu-Natal		2015-2016
“Advanced Astrophysics” 4th-yr physics major at University of KwaZulu-Natal		2017-2022

**Lecturer**

–lecture the module, do the tutorials, mark the tests and exams		
1st-yr undergraduate “Modern Physics” for non-physics majors at UKZN		2016-2021
2nd-yr undergraduate “Quantum Physics” for physics major at UKZN		2016-2018
1st-yr undergraduate “Mechanics” for physics and non-physics majors at UKZN		2017-2022
1st-yr undergraduate “Thermodynamics” for physics major at UKZN		2023
3rd-yr undergraduate “Electromagnetism” for physics major at Stellenbosch		2024

**Example Class Teacher**

3rd-yr undergraduate “Cosmology” for physics major at Manchester U.		2015
–instruct students to solve problems in cosmology lectures		

**Laboratory Supervisor**

1st-yr undergraduate physics and non-physics majors at U. of KwaZulu-Natal		2016
–supervise students to conduct 1st-yr physics experiment		

**Guest Lecturer**

Graduate lectures “IGM and 21-cm Cosmology” at Tsinghua University		2018
–develop and lecture the whole graduate course for 12 hrs		
Graduate lectures “21-cm Physics” in Brazil National Institute of Space		2018
–lecture 4-sessions for the “2018-INPE Summer School”		

**ACADEMIC  
SERVICE****University Service**

Organizer of astronomy lunch discussion in University of British Columbia		2013-2014
Organizer of weekly astronomy colloquium in University of British Columbia		2012-2014
Organizer of weekly astrophysics seminar at University of KwaZulu-Natal		2018-present
Faculty PI of “Big Data in Science and Society” project at UKZN		2019-2021
–organized cross-discipline people to work on machine learning		
Judge of UKZN annual postgraduate students research symposium (PRIS)		2020-2021
Founding Head of Astrophysics Division, Stellenbosch University		2023-present
– I established the Astrophysics Division in Physics department, recruited new faculty and structured the graduate research program		

**Academic Community Service**

BRICS country “21-cm Cosmology” collaboration	2017-present
Chair of NRF Chinese-South African Forum of Astronomy	2017-present
Council Member, BRICS Association of Gravity and Astrophysics	2019-2024
Panel member for Physics, Astronomy, Mathematics and ICT of NRF	2020-2023
Science Committee Member of African Astronomical Society (AfAS)	2023-present
Several (external) Universities faculty hire committee	2023-present
MeerKAT Large Area Synoptic Survey (MeerKLASS) Advisory Committee	2023-present
Academy of Sciences of South Africa (ASSAf) Membership Committee	2023-present

**Grant Review for ...**

National Research Foundation (South Africa)	
– Bilateral and Multi-lateral Grants	2017, 2024
– Researcher Rating	2017
– Research Chair Initiative	2020
Dutch Research Council Innovational Research Incentives Scheme(Vidi)	2019

**Conference Organization**

LOC member, Canadian Astronomy 2013 Annual Meeting (CASCA)	2013
Chair, South Africa-China bilateral on Cosmology	2016
SOC member, “Cosmology on Safari” International Conference	2017, 2019 & 2023
Chair, Second BRICS Symposium on Astrophysics	2018
SOC member, Ninth International Fermi Symposium	2020
SOC member and Outreach Program Coordinator of the 183th- Nobel Symposium “Predictability of Science in the Age of AI”	2022
Chair, China-South Africa 21-cm cosmology online Forum	2022
SOC member, African Astronomical Society (AfAS) Annual Meeting	2023-2024

**Membership of Professional Society**

Royal Astronomical Society (RAS)	since 2009
American Astronomical Society (AAS)	since 2010
Canadian Astronomical Society (CASCA)	since 2012
South Africa Institute of Physics (SAIP)	since 2015
International Astronomical Union (IAU)	since 2020
Member of Royal Society of South Africa (RSSAf)	since 2022

**I have also been an external examiner for 10 masters and 5 PhD students’ thesis.**

**PUBLIC  
ENGAGEMENT****Public speeches for general audiences:**

“Inflation after WMAP 2008 results”, Cambridge Astronomical Society	2009
“Doing a PhD in Astronomy”, UK Space Conference	2009
“Cosmology: from observable to invisible Universe”, UK Space Conference	2009
“The large scale nature of the Universe”, Cambridge Astronomy Evening	2010
“Two roads to modern cosmology”, Trinity College Cambridge	2011
“Life in the Universe”, St. John’s college, University of British Columbia	2012
“Higgs Particle and the Universe”, St. John’s college, UBC/Canada	2012
“Life in the Universe”, UBC postdoctoral symposium	2013
“Our Cosmic Environment”, St. John’s College, University of British Columbia	2013
“Two roads to Modern Cosmology-with Planck 2015 results”, Manchester U.	2015
“Life in the Universe”, QianNan Normal College/China	2018
“The Hubble conundrum: A Physical Solution”, University of KwaZulu-Natal	2021
Several high-school talks & Campus open day in Durban, South Africa	2017-
“Cosmology: A Golden Era”, University of the Western Cape	2022
Organising the 183rd Nobel Symposium Outreach Event in South Africa	2022
“What we will never know?” Science Cafe at Toyota US Woodfees Festival	2023

**PUBLIC  
ENGAGEMENT  
cont.****Press Release & Media Interview:**

Media Interview on weighting mass of Milky Way and Andromeda –e.g. “New Scientists”, “Metro News”, “VICE” (Canada), CCTV (China)	2014
SouthAfrica BroadCast (SABC) Interview on Missing baryons <a href="https://www.youtube.com/watch?v=WpXLicYnFFw">https://www.youtube.com/watch?v=WpXLicYnFFw</a>	2015
People’s Daily Online interview for China-South Africa Astronomy Bridge	2018
Broadcast Brazil Interview on 21-cm cosmology	2018
Press Release on HERA leadership and milestone limit for EoR epoch	2021
Magazine Interview for South Africa Institute of Physics	2022
Nature (Journal) Interview for Fast Radio Bursts during 369th IAU Symposium	2022
Press release for “Excellence in Africa” 100 Africa’s PhD program	2022
CGTN Interview for “Nobel in Africa” Outreach seminar at Western Cape/SA <a href="https://www.youtube.com/watch?v=p9CZIDbHE7s&amp;t=32s">https://www.youtube.com/watch?v=p9CZIDbHE7s&amp;t=32s</a>	2022
Press release on being elected to Academy of Science of South Africa (ASSAf) <a href="https://tinyurl.com/5x2d9y9r">https://tinyurl.com/5x2d9y9r</a>	2022
Trinity Colleg Cambridge “The Fountain” Issue 32, Summer 2023 coverage <a href="https://www.trin.cam.ac.uk/alumni/publications/the-fountain/">https://www.trin.cam.ac.uk/alumni/publications/the-fountain/</a>	2023
CGTN Movie on “Faces of Africa–Echoes of the Skies” <a href="https://www.youtube.com/watch?v=mUrcHMmd_qE&amp;t=498s">https://www.youtube.com/watch?v=mUrcHMmd_qE&amp;t=498s</a>	2023
Press Release of Strengthening Stellenbosch University Astronomy Research <a href="http://www.sun.ac.za/english/Lists/news/DispForm.aspx?ID=10142">http://www.sun.ac.za/english/Lists/news/DispForm.aspx?ID=10142</a>	2023

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# 1 Summary of Publication (by December 12, 2024)

## 1.1 Statistics

- **139** peer-reviewed journal publications (**70+30+39**)
  - A list: 70 Leading-author and corresponding-author publications.** (The corresponding-author paper is usually my student's or postdoc's project which I initialised the idea, supervised them to conduct the research, and guided through each step of calculation and wrapped up with scientific writing)
  - B list: 30 small-group ( $\leq 15$  authors) collaborative publications**
  - C list: 39 large-group ( $> 15$  authors) collaborative publications** (e.g. Planck, HERA, SKA)
- **7** conference proceedings
- **11** Astro2020 Decadal Survey Science White papers
- h-index: **47** (NASA/ADS metric (most accurate): <https://tinyurl.com/yy118dpo>)  
**50**(Google Scholar metric: <https://tinyurl.com/2zxtpncu>)
- Total citation. NASS/ADS: 31793; Google Scholar: 35976
- Normalised citation: 844.3

## 1.2 Major Research Impact<sup>1</sup>

1. **The single-dish and interferometer radio astronomy technique for 21-cm intensity mapping:** A1, A9, A10, A13, A14, A17, A18, A21, A27, A28, A34, B2, B3, B4, B5, B3, B9, B18, B21, B27, C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C12, C13, C14.
2. **Exquisite large-scale structure cross-correlation methods:** A4, A5, A6, A12, A16, A19, A26, A30, A35, A39, A40, A44, A53, B1, B6, B14, B15, B16, B20, B22, B25, B28.
3. **Estimators of peculiar velocity and kinematic Sunyaev-Zeldoviche effects:** A32, A33, A41, A45, A46, A47, A48, A51, A54, A57, A59, A60, A63, B24, B26, B30.
4. **Examining theories of cosmology with cosmic microwave background and large-scale structure data:** A2, A3, A10, A11, A20, A22, A23, A29, A31, A38, A42, A43, A49, A50, A52, A55, A56, A58, A61, A62, A64, A65, A66, A67, A68, A69, A70, B7, B8, B10, B11, B12, B17, B19, B29, C11, C18, C19, C22, C39.

## 1.3 14 most significant papers

- A7 **Solar gamma ray probe of local cosmic ray electrons.** Hong-Gang Yang, Yu Gao, **Yin-Zhe Ma**, Roland M. Crocker, **2023**, Physical Review D (Letter) 108, L061304  
Proposed a novel and generic way of testing cosmic ray electron spectra with Solar inverse-Compton scattering effect
- A13 **Searching for axion dark matter with MeerKAT Radio Telescope.** Yun-Fan Zhou, Nick Houston, Gyula I. G. Jozsa, Hao Chen, **Yin-Zhe Ma**, Qiang Yuan, Tao An, Yogesh Chandola, Ran Ding, Fujun Du, Shao-Guang Guo, Xiaoyuan Huang, Mengtian Li, Chandreyee Sengupta, **2022**, Physical Review D, 106, 083006  
The very first work of using interferometric mode of MeerKAT telescope to search for potential radio signal from Axion dark matter and place unique constraint on Axion decay rate in mass range  $4.20-4.35\mu\text{eV}$ . The first author is a master student of mine, and I supervised this research for his master thesis.

<sup>1</sup>The number refer to entry in the complete list (Sec. 2).

- A17 **The Correlation Calibration of PAPER-64 data.** Tamirat G. Gogo, **Yin-Zhe Ma**, Piyanat Kittiwisit, Jonathan L. Sievers, Aaron R. Parsons, Jonathan C. Pober, Daniel C. Jacobs et al., **2022**, Monthly Notices of the Royal Astronomical Society, 510, 1680-1696  
Invented a completely new method to calibrate radio interferometers, and applied it to the “Precision Array for Probing the Epoch of Reionization” (PAPER) data.
- A20 **Reconciling Hubble Constant Discrepancy from Holographic Dark Energy.** Wei-Ming Dai, **Yin-Zhe Ma**, Hong-Jian He, **2020**, Physical Review D (Rapid Communication), 102, 121302  
Proposed a novel way to reconcile the local distance ladder measurements and CMB measurement of  $H_0$  by using holographic principle. The model beautifully resolves the tension and is verifiable and falsifiable by future data.
- A21 **The neutral hydrogen distribution in large-scale haloes from 21-cm intensity maps.** Denis Tramonte, **Yin-Zhe Ma**, **2020**, Monthly Notices of the Royal Astronomical Society, 498, 5916-5935  
The first paper detected the 21-cm emission of neutral hydrogen in stacked dark matter halo at high significance, directly constrained HI profile.
- B16 **A Search for Warm/Hot Gas Filaments Between Pairs of SDSS Luminous Red Galaxies.** Hideki Tanimura, Gary Hinshaw, Ian G. McCarthy, Ludovic Van Waerbeke, **Yin-Zhe Ma**, Alexander Mead, Alireza Hojjati, Tilman Troster, **2019**, Monthly Notices of the Royal Astronomical Society, 483, 223-234  
The first paper detected the warm-hot ionised gas signal ( $10^5$ – $10^7$  K) in cosmic filaments.
- A30 **Planck intermediate results. LIII. Detection of velocity dispersion from the kinetic Sunyaev-Zeldovich effect.** N. Aghanim et al., **2018**, Astronomy and Astrophysics, 617, A48  
The first detection of temperature dispersion of kinetic Sunyaev-Zeldovich effect caused by galaxy clusters. I led a team of 80 people for this project.
- C39 **Planck 2015 results. XX. Constraints on inflation.** P. A. R. Ade et al., Planck Collaboration, **2016**, Astronomy and Astrophysics, 594, 20P  
A crucial paper of Planck scientific result. I heavily contributed to Section 12 (statistical anisotropy).
- A40 **Probing the diffuse baryon distribution with the lensing-tSZ cross-correlation.** **Yin-Zhe Ma**, Ludovic Van Waerbeke, Gary Hinshaw, Alireza Hojjati, Douglas Scott, and Joe Zuntz, **2015**, Journal of Cosmology and Astroparticle Physics, 09, 046 (14 pages)  
Showed a strong and pioneer observational evidence that a significant fraction of ionised baryons (>30%) lies outside virial radii of dark matter halo.
- B25 **Evidence of the missing baryons from the kinetic Sunyaev-Zeldovich effect in Planck data.** Carlos Hernandez-Monteagudo, **Yin-Zhe Ma**, Francisco-Shu Kitaura, Wenting Wang, Ricardo Genova-Santos, Juan Macias-Perez, Diego Herranz, **2015**, Physical Review Letters, 115, 191301  
The first reconstruction of cosmic baryon fraction from kinetic Sunyaev-Zeldovich effect. The paper is highlighted in the front cover of Physical Review Letters.
- A54 **Cosmic bulk flows on  $50h^{-1}$  Mpc scales: A Bayesian hyper-parameter method and multishells likelihood analysis.** **Yin-Zhe Ma**, and Douglas Scott, **2013**, Monthly Notices of the Royal Astronomical Society, 428, 2017-2029 (13 pages)  
A critical paper to resolve large bulk flow puzzle.

- A62 **Testing a direction-dependent power spectrum with observations of cosmic microwave background.** Yin-Zhe Ma, George Efstathiou and Anthony Challinor, **2011**, Physical Review D, 83, 083005 (8 pages)  
The first paper to define an unbiased, minimal-variance direction-dependent estimator for all quadrupolar primordial anisotropy for CMB sky. The formalism is latter heavily used by *Planck* and many other studies.
- A63 **Peculiar velocity field: constraining the tilt of the Universe.** Yin-Zhe Ma, Christopher Gordon and Hume Feldman, **2011**, Physical Review D, 83, 103002 (7 pages)  
A conceptually novel idea to connect large bulk flow with “incompleteness” of cosmic inflation, and to put a limit for number of  $e$ -folds of inflation (duration).
- A68 **Features of holographic dark energy under the combined cosmological constraints.** Yin-Zhe Ma, Yan Gong and Xuelei Chen, **2009**, European Journal of Physics C, 60, 303-315 (13 pages)  
The first comprehensive constraints on holographic dark energy with the latest observational data, gained 98 citations by December 12, 2024.

## 2 Complete Journal Publication List (reverse chronological)

### A: Leading-author and Corresponding-author papers

Contribution: For leading author papers, I initialized the idea, carried out the research, communicated with collaborators for their opinions, wrote up the draft and corresponded with the journal. The corresponding author papers are the students’ or junior postdoc’s research projects under my supervision. I am responsible for proposing the idea, laying out critical steps, guiding their computation to the end, and editing the paper draft.

- A1 Wei-Ming Dai, **Yin-Zhe Ma**, **2024**, The Astrophysical Journal Supplement Series in Press, arXiv: 2411.16899  
*Expanded Generalized Needlet Internal Linear Combination (eGNILC) Framework for the 21-cm Foreground Removal*
- A2 Xin Tang, **Yin-Zhe Ma**, Wei-Ming Dai, Hong-Jian He, **2024**, Physics of the Dark Universe, 46, 101568, arXiv: 2407.08427  
*Constraining holographic dark energy and analyzing cosmological tensions*  
<https://doi.org/10.1016/j.dark.2024.101568>
- A3 Chandan G. Nagarajappa, & **Yin-Zhe Ma**, **2024**, Monthly Notices of the Royal Astronomical Society, 529, 3289-3300, arXiv: 2403.02115  
*Constraining primordial non-Gaussianity using Neural Networks*  
<https://doi.org/10.1093/mnras/stae679>
- A4 Gang Li, **Yin-Zhe Ma**, Denis Tramonte, Guo-Liang Li, **2024**, Monthly Notices of the Royal Astronomical Society, 27, 2663-2671, arXiv: 2311.00826  
*Cross-correlation of cosmic voids with thermal Sunyaev-Zel’dovich data*  
<https://doi.org/10.1093/mnras/stad3396>
- A5 Ayodeji Ibitoye, Wei-Ming Dai, **Yin-Zhe Ma**, Patricio Vielva, Denis Tramonte, Amare Abebe, Aroonkumar Beesham, Xuelei Chen, **2024**, The Astrophysical Journal Supplement Series (ApJS),

- 270, 16, arXiv: 2310.18478  
*Cross-correlation between the thermal Sunyaev-Zeldovich effect and the Integrated Sachs-Wolfe effect*  
<https://doi.org/10.3847/1538-4365/ad08c5>
- A6 Charles R. H. Walker, Laura G. Spitler, **Yin-Zhe Ma**, Cheng Cheng, M. Celeste Artale, & Cameron Hummels, **2024**, *Astronomy and Astrophysics*, 683, A71, arXiv: 2309.08268  
*The Dispersion Measure Contributions of the Cosmic Web*  
<https://doi.org/10.1051/0004-6361/202347139>
- A7 Hong-Gang Yang, Yu Gao, **Yin-Zhe Ma**, Roland M. Crocker, **2023**, *Physical Review D (Letter)* 108, L061304, arXiv: 2309.04784  
*Solar gamma ray probe of local cosmic ray electrons*  
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- A8 Guo-Jian Wang, Cheng Cheng, **Yin-Zhe Ma** Jun-Qing Xia, Amare Abebe, and Aroonkumar Beesham, **2023**, *The Astrophysical Journal Supplement Series*, 268, 7, arXiv: 2306.11102  
*CoLFI: Cosmological Likelihood-free Inference with Neural Density Estimators*  
<https://doi.org/10.3847/1538-4365/ace113>
- A9 Yogesh Chandola, Chao-Wei Tsai, Di Li, Chandreyee Sengupta, **Yin-Zhe Ma**, Pei Zuo, **2023**, *Monthly Notices of the Royal Astronomical Society*, 523, 3848-3862, arXiv: 2305.16786  
*GMRT HI mapping of mid-infrared bright Blue Compact Dwarf Galaxies W1016+3754 & W2326+0608*  
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- A10 Wen-Qing Guo, Yichao Li, Xiaoyuan Huang, **Yin-Zhe Ma**, Geoff Beck, Yogesh Chandola, Feng Huang, **2023**, *Physical Review D*, 107, 103011, arXiv: 2209.15590  
*Constraints on dark matter annihilation from the FAST observation of the Coma Berenices dwarf galaxy*  
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- A11 Junsong Cang, **Yin-Zhe Ma**, Yu Gao, **2023**, *The Astrophysical Journal*, 949, 64 (6 pages), arXiv: 2210.03476  
*Implications for primordial black holes from cosmological constraints on scalar-induced gravitational wave*  
<https://iopscience.iop.org/article/10.3847/1538-4357/acc949/pdf>
- A12 Denis Tramonte, **Yin-Zhe Ma**, Ziang Yan, Matteo Maturi, Gianluca Castignani, Mauro Sereno, Sandro Bardelli, Carlo Giocoli, Federico Marulli, Lauro Moscardini, Emanuella Puddu, Mario Radovich, Ludovic Van Waerbeke, and Angus H. Wright, **2023**, *The Astrophysical Journal Supplement Series*, 265, 55 (31 pages), arXiv: 2302.06266  
*Exploring the mass and redshift dependence of the cluster pressure profile with stacks on thermal SZ maps*  
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- A13 Yun-Fan Zhou, Nick Houston, Gyula I. G. Jozsa, Hao Chen, **Yin-Zhe Ma**, Qiang Yuan, Tao An, Yogesh Chandola, Ran Ding, Fujun Du, Shao-Guang Guo, Xiaoyuan Huang, Mengtian Li, Chandreyee Sengupta, **2022**, *Physical Review D*, 106, 083006, arXiv: 2209.09695  
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<https://journals.aps.org/prd/pdf/10.1103/PhysRevD.106.083006>

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*HIPASS detections of southern ultradiffuse galaxies and low surface brightness galaxies*  
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- A15 Guo-Jian Wang, Cheng Cheng, **Yin-Zhe Ma**, Jun-Qing Xia, **2022**, The Astrophysical Journal Supplement Series, 262, 24 (14 pages); arXiv: 2207.00185  
*Likelihood-free Inference with Mixture Density Network*  
<https://iopscience.iop.org/article/10.3847/1538-4365/ac7da1/pdf>
- A16 Ayodeji Ibitoye, Denis Tramonte, **Yin-Zhe Ma**, Wei-Ming Dai, **2022**, The Astrophysical Journal, 935, 18 (18 pages), arXiv: 2206.05689  
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- A17 Tamirat G. Gogo, **Yin-Zhe Ma**, Piyanat Kittiwisit, Jonathan L. Sievers, Aaron R. Parsons, Jonathan C. Pober, Daniel C. Jacobs et al., **2022**, Monthly Notices of the Royal Astronomical Society, 510, 1680-1696  
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- A18 Elimboto Yohana, **Yin-Zhe Ma**, Di Li, Xuelei Chen, Wei-Ming Dai, **2021**, Monthly Notices of the Royal Astronomical Society, 504, 5231-5243  
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- A20 Wei-Ming Dai, **Yin-Zhe Ma**, Hong-Jian He, **2020**, Physical Review D, 102, 121302 (Rapid Communication)  
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- A23 Moumita Aich, **Yin-Zhe Ma**, Wei-Ming Dai, Jun-Qing Xia, **2020**, Physical Review D, 101, 063536  
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- A26 Anthony Walters, **Yin-Zhe Ma**, Jonathan Sievers, Amanda Weltman, **2019**, *Physical Review D*, 100, 103519  
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- A29 Wei-Ming Dai, **Yin-Zhe Ma**, Zong-Kuan Guo, Rong-Gen Cai, **2019**, *Physical Review D*, 99, 043524  
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- A30 N. Aghanim et al., Planck Collaboration **2018**, *Astronomy and Astrophysics*, 617, A48  
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- A32 **Yin-Zhe Ma**, Guo-Dong Gong, Ning Sui, Ping He, **2018**, *Monthly Notices of the Royal Astronomical Society*, 475, 379-390  
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- A33 Yi-Chao Li, **Yin-Zhe Ma**, Mathieu Remazeilles, Kavilan Moodley, **2018**, *Physical Review D*, 97, 023514  
*Measurement of the pairwise kinematic Sunyaev-Zeldovich effect with Planck and BOSS data*  
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- A34 Yi-Chao Li, **Yin-Zhe Ma**, **2017**, *Physical Review D*, 96, 063525  
*Constraints on Primordial non-Gaussianity from Future HI Intensity Mapping Experiments*  
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- A35 **Yin-Zhe Ma, 2017**, Nuclear Physics B, 920, 402-418  
*Constraining the ionized gas evolution with CMB-spectroscopic survey cross-correlation*  
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- A36 **Yin-Zhe Ma, & Shuang-nan Zhang, 2016**, Physics Education (IOP), 51, 065011 (6 pages)  
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- A37 **Yin-Zhe Ma, Douglas Scott, 2016**, Physical Review D, 93, 083510 (8 pages)  
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- A38 Yi Wang, & **Yin-Zhe Ma, 2016**, Nuclear Physics B, 906, 367-380 (5 pages)  
*CMB Cold Spot from Inflationary Feature Scattering*  
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- A41 **Yin-Zhe Ma, Min Li, and Ping He, 2015**, Astronomy and Astrophysics, 583, 52 (7 pages)  
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- A42 Yan Gong, **Yin-Zhe Ma, Shuang-nan Zhang, and Xuelei Chen, 2015**, Physical Review D, 92, 063523 (11 pages)  
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- A43 **Yin-Zhe Ma and Yi Wang, 2014**, Journal of Cosmology and Astroparticle Physics, 09, 041 (14 pages)  
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- A44 **Yin-Zhe Ma and Aaron Berendsen, 2014**, Astronomy and Computing, 5, 45-56 (12 pages)  
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- A45 **Yin-Zhe Ma and Jun Pan, 2014**, Monthly Notices of the Royal Astronomical Society, 437, 1996-2004 (9 pages)  
*An estimation of local bulk flow with maximum likelihood method*  
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- A46 **Yin-Zhe Ma, Douglas Scott, 2014**, Astronomy and Geophysics, 55 (3): 3.33-3.36 (4 pages)  
*Velocities hasten to tell us about the Universe*  
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- A47 **Yin-Zhe Ma** and Gong-Bo Zhao, **2014**, Physics Letters B, 735, 402-411 (10 pages)  
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- A48 Andrew Johnson, Chris Blake, Jun Koda, **Yin-Zhe Ma**, Matthew Colless, Matthew Colless, Martin Crocce, Tamara M. Davis, Heath Jones, John R. Lucey, Christina Magoulas, Jeremy Mould, Morag Scrimgeour, Christopher M. Springob, **2014**, Monthly Notices of the Royal Astronomical Society, 444, 3926-3947 (22 pages)  
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- A49 Yi Wang and **Yin-Zhe Ma**, **2014**, SCIENCE CHINA, Physics, Mechanics & Astronomy, 57(8): 1466-1470 (5 pages)  
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- A50 Michael Sitwell, Andrei Mesinger, **Yin-Zhe Ma**, Kris Sigurdson, **2014**, Monthly Notices of the Royal Astronomical Society, 438, 2664-2671 (8 pages)  
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- A51 **Yin-Zhe Ma**, James E. Taylor and Douglas Scott, **2013**, Monthly Notices of the Royal Astronomical Society, 436, 2029-2037 (9 pages)  
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Contribution: I initialized the idea, collaborated with researchers to carry out the research, and edit the paper draft.

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### C: Large collaboration (more than 15 authors)

Contribution: I collaborated with the project group to carry out research.

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- P5 M.-A. Bigot-Sazy, **Y.-Z. Ma**, R. A. Battye, I. W. A. Browne, T. Chen, C. Dickinson, S. Harper, B. Maffei, L. C. Olivari, P. N. Wilkinson, **2016**, *Astronomical Society of the Pacific Conference Series*, 502, 41-48 (8 pages)  
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## 4 Miscellaneous

### 4.1 Astro2020 Decadal Survey Science White papers

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*Research and Development for HI Intensity Mapping*  
<https://ui.adsabs.harvard.edu/abs/2019arXiv190713090A/abstract>
2. M. A. Alvarez et al., **2019**, arXiv:1903.04580  
*Mapping Cosmic Dawn and Reionization: Challenges and Synergies*  
<https://ui.adsabs.harvard.edu/abs/2019arXiv190304580A/abstract>
3. A. Cooray et al., **2019**, Bulletin of the American Astronomical Society, 51, 48, arXiv:1903.03629  
*Cosmic Dawn and Reionization: Astrophysics in the Final Frontier*  
<https://tinyurl.com/yca9yslf>
4. S. Furlanetto et al., arXiv:1903.06197  
*Astro2020 Science White Paper: Synergies Between Galaxy Surveys and Reionization Measurements*  
<https://ui.adsabs.harvard.edu/abs/2019arXiv190306197F/abstract>
5. S. Furlanetto, et al., **2019**, arXiv: 1903.06204  
*Astro2020 Science White Paper: Insights Into the Epoch of Reionization with the Highly-Redshifted 21-cm Line*  
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6. S. Furlanetto, et al., **2019**, arXiv: 1903.06212  
*Astro2020 Science White Paper: Fundamental Cosmology in the Dark Ages with 21-cm Line Fluctuations*  
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7. HERA Collaboration: A. Parsons, J E. Aguirre, A. P. Beardsley, et al., **2019**, Bulletin of the American Astronomical Society, 51, 241  
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8. J. Mirocha et al., **2019**, arXiv:1903.06218  
*Astro2020 Science White Paper: First Stars and Black Holes at Cosmic Dawn with Redshifted 21-cm Observations*  
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9. P. La Plante, et al., **2019**, Bulletin of the American Astronomical Society, 51, 394  
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10. A. Liu, J. Aguirre, Y. Ali-Haimoud, et al, **2019**, Bulletin of the American Astronomical Society, 51, 63, arXiv: 1903.06240  
*Cosmology with the Highly Redshifted 21 cm Line*  
<https://tinyurl.com/yc8s6exs>

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<sup>2</sup>The Astro2020 decadal survey is a survey from the National Academies of Sciences, Engineering, and Medicine identifies scientific priorities, opportunities, and funding recommendations for the next 10 years of astronomy and astrophysics in the US. These papers discuss the pathways to discoveries in Astronomy and Astrophysics for the 2020s drew from the astronomical community.

11. P. Timbie, et al., **2019**, Bulletin of the American Astronomical Society, 51, 71  
*Research and Development for HI Intensity Mapping*  
<https://ui.adsabs.harvard.edu/abs/2019BAAS...51g..71T/abstract>

## 4.2 Snowmass 2021 White Papers

1. Clarence L. Chang et al.<sup>3</sup>, **2021**, arXiv:2203.07638  
*Snowmass2021 Cosmic Frontier: Cosmic Microwave Background Measurements White Paper*  
<https://ui.adsabs.harvard.edu/abs/2022arXiv220307638C/abstract>
2. Kevork Abazajian et al., **2021**, arXiv: 2203.08024  
*Snowmass 2021 CMB-S4 White Paper*  
<https://ui.adsabs.harvard.edu/abs/2022arXiv220307638C/abstract>

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<sup>3</sup>The Snowmass Process is a particle physics community planning exercise sponsored by the Division of Particles and Fields of the American Physical Society. During this process, scientists develop a collective vision for the next seven to ten years for particle physics research in the US. These papers summarise the ideas and discussions.