Jin-Ping Zhu

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Employment

Monash University **Melbourne, Australia**
OzGrav Postdoctoral Research Fellow (Host: Prof. Ilya Mandel) *Feb 2023 - Present*

Education

Peking University **Beijing, P.R.China**
Ph.D. in Astrophysics (Advisors: Prof. Bing Zhang & Prof. Zhuo Li) *Sep 2017 - July 2022*

Central China Normal University **Wuhan, Hubei, P.R.China**
B.Sc. in Physics (Advisor: Prof. Yun-Wei Yu) *Sep 2013 - June 2017*

Research Interest

- Multi-messenger (gravitational waves, neutrinos, and electromagnetic radiation) astrophysics
- Electromagnetic counterparts of gravitational wave sources (kilonovae, short gamma-ray bursts associated with binary neutron mergers and neutron star–black hole mergers, transients associated with neutron star–white dwarf mergers)
- Gamma-ray bursts, supernovae, kilonovae, accretion-induced collapse of white dwarf, and fast radio bursts
- Compact object coalescences and supernovae embedded in AGN accretion disks
- Detailed binary evolution and population synthesis simulation
- Testing fundamental physics

Conference Talks

- Sep. 10th, 2024—"Formation of GW230529 from Isolated Binary Evolution and Multimessenger sources of NSBH Mergers", 11th Fermi Symposium 2024
- Feb. 1st, 2024—"Formation of Fast-spinning Neutron Stars in Close Binaries and Magnetar-driven Stripped-Envelope Supernovae", Transients Down Under
- Dec. 14th, 2024—"A Unified Progenitor Model of SLSNe I, lGRBs, SNe Ic-BL and FBOTs", Texas Symposium at Shanghai
- May. 03rd, 2023—"Detectability of Electromagnetic Signals from Neutron Star Mergers", OzFink Workshop 2023
- Aug. 4th, 2022—"Electromagnetic Signals from neutron star–black hole mergers", FPS11 & SPSS2022
- Jun. 16th, 2022—"Multi-messenger Signals from Compact Object Coalescences and Transients in AGN Disks", The 60th Anniversary of X-Ray Astronomy: X-ray Astronomy in the Time-domain & Multi-messenger Era
- Dec. 18th, 2021—"No Detectable Kilonova Counterpart is Expected for O3 Neutron Star–Black Hole Candidates", Beijing 2021, Physics Five Universities, the National Top
- Nov. 26th, 2021—"Neutron Star–Black Hole Mergers and Associated Electromagnetic Signals", High Energy Time Domain Astronomy Academic Symposium
- July. 5th, 2021—"No Detectable Kilonova Counterpart is Expected for O3 Neutron Star–Black Hole Candidates", The 16th Marcel Grossmann Meeting

- June. 23rd, 2021—"Neutron Star Mergers in AGN Accretion Disks", Gravitational-wave Astrophysics Conference 2021
- May. 21st, 2021—"Supernovae and Compact Object Coalescences in AGN Accretion Disks", The 13th Zhang Heng Academic Symposium of Chinese Astronomical Society
- Oct. 13rd, 2020—"Kilonova Emission from Black Hole–Neutron Star Mergers", Chinese Astronomical Society Annual Conference
- Dec. 17th, 2019—"Kilonova Emission from Black Hole–Neutron Star Mergers", High Energy Time Domain Astronomy Academic Symposium
- Oct. 28th, 2018—"Testing Special Relativity using the Breakthrough Starshot", Chinese Astronomical Society Annual Conference

Colloquia and Seminars (all Invited)

- Oct. 9th, 2024—"Magnetar-powered Supernovae form Close Binaries", University of California, Berkeley
- Sep. 30th, 2024—"Multi-messenger Signals from Catastrophic Explosions in AGN Accretion Disks", Caltech
- Sep. 26th, 2024—"Multi-messenger Signals from Neutron Star Mergers and Their Detection", University of Nevada, Las Vegas
- Jan. 16th, 2024—"Multi-messenger Signals from Transients in AGN Disks", Beijing Normal University at Zhuhai
- Dec. 20th, 2023—"Multi-messenger Signals from Transients in AGN Disks", Nanjing University
- Dec. 1st, 2023—"Multi-messenger Signals from Transients in AGN Disks", OzGrav announcements and Data/Astro talk
- May. 30th, 2023—"Multi-messenger Signals from Compact Object Coalescences and Transients in AGN Disks", Aus/NZ Orange pulssar meeting
- May. 17th, 2023—"Multi-messenger Signals from Compact Object Coalescences and Transients in AGN Disks", University of Melbourne
- Mar. 31st, 2023–"Formation of Fast-spinning Neutron Stars in Close Binaries and Magnetar-driven Stripped-envelope Supernovae", OzGrav announcements and Data/Astro talk
- Feb. 17th, 2023–"Formation of Fast-spinning Neutron Stars in Close Binaries and Magnetar-driven Stripped-envelope Supernovae", Tsinghua University
- Dec. 15th, 2022—"Magnetar-driven Supernovae, Close-orbit Compact Binary, and Eletromagnetic Counterparts", Beijing Normal University at Zhuhai
- Jul. 15th, 2022—"Multi-messenger Signals from Compact Object Coalescences and Transients in AGN Disks", Wuhan University
- Jan. 26th, 2022—"Multi-messenger Signals from Compact Object Coalescences and Transients in AGN Disks", Weizmann Institute of Science
- June. 8th, 2021—"Supernovae and Compact Object Coalescences in AGN Accretion Disks", National Astronomical Observatories of the Chinese Academy of Sciences
- May. 12th, 2021—"Supernovae and Compact Object Coalescences in AGN Accretion Disks", Institute of High Energy Physics of the Chinese Academy of Sciences
- Dec. 7th, 2020—"Kilonova Emission from Black Hole–Neutron Star Mergers. Lightcurves, Luminosity Function, and Implications for Future Searches", University of Minnesota (ZTF group)
- Nov. 24th, 2020—"Kilonova Emission from Black Hole–Neutron Star Mergers. Lightcurves, Luminosity Function, and Implications for Future Searches", Yunnan University
- Nov. 11th, 2020—"Kilonova Emission from Black Hole–Neutron Star Mergers", Huazhong University of Science and Technology
- Oct. 14th, 2020—"Kilonova Emission from Black Hole–Neutron Star Mergers", Central China Normal University

Professional Service

Referee: Nature Astronomy (×2), Nature Communication, The Astrophysical Journal Letters, The Astrophysical Journal (×2), Journal of High Energy Astrophysics, Chinese Science Bulletin (×3), Journal of the Optical Society of America A

Synergistic activity and outreach experience:

- 2022—LSST Group Member
- 2018—Teaching Assistant for undergraduate course "General astronomy"
- 2018—Volunteer for International Olympiad on Astronomy and Astrophysics
- 2017-2019—Organizer for Weekly "Badminton Activity" of DoA and KIAA
- 2016-2018—Speaker of the Astronomy Popular Science Lecture at Central China Normal University
- 2016—Volunteer for 2016 Annual Conference of Chinese Astronomical Society

Awards and Highlights

- 2024—The paper "Bumpy Superluminous Supernovae Powered by a Magnetar-star Binary Engine" was highlighted by AAS Nova
- 2024—The China Top Cited Paper Award 2024 for the paper "Neutron Star Mergers in Active Galactic Nucleus Accretion Disks: Cocoon and Ejecta Shock Breakouts"
- 2022 Award for Outstanding Graduates of Beijing
- 2022 Award for Outstanding Graduates of Peking University
- 2022—Award for Outstanding Pacesetter Student of Peking University
- 2021-2022—Award for President's Scholarship of Peking University
- 2020—The China Top Cited Paper Award 2020 for the paper "A Statistical Study of Superluminous Supernovae Using the Magnetar Engine Model and Implications for their Connection with Gamma-Ray Bursts and Hypernovae"
- 2020-2022—Award for Academic Scholarship
- 2019-2021—Award for Outstanding Students of Peking University
- 2017—Award for Outstanding Undergraduates of Central China Normal University

Citation Statistics

Total citations: 616 (NASA ADS)
h-index: 15 (NASA ADS)
All ADS entries: `https://ui.adsabs.harvard.edu/public-libraries/Ln4PKrMJTI2KGSaYTUw6Rw`

Publications [17 first-author papers (16 published), total 38 papers (36 published)]

First-author publications (16 papers):

(1) Bumpy Superluminous Supernovae Powered by a Magnetar-star Binary Engine
Zhu, Jin-Ping.*, Liu, Liang-Duan., Yu, Yun-Wei.*, Mandel, Ilya., Hirai, Ryosuke., Zhang, Bing., Chen, Aming.
The Astrophysical Journal Letters, Volume 970, Issue 2, id.L42, 14 pp, 2024 (arXiv:2405.01224)

(2) Formation of GW230529 from Isolated Binary Evolution
Zhu, Jin-Ping.*, Hu, Rui-Chong.*, Kang, Yacheng., Zhang, Bing.*, Tong, Hui., Shao, Lijing., Qin, Ying.
The Astrophysical Journal, Volume 974, Issue 2, id.974, 11 pp, 2024 (arXiv:2404.10596)

(3) Formation of Lower Mass-gap Black Hole–Neutron Star Binary Mergers through Super-Eddington Stable Mass Transfer
Zhu, Jin-Ping.*, Qin, Ying.*, Hu, Rui-Chong., Wang, Zhen-Han-Tao., Zhang, Bing., Wu, Shichao
Monthly Notices of the Royal Astronomical Society, Volume 529, Issue 4, id.4554, 11 pp, 2024 (arXiv:2310.14256)

(4) High-energy Neutrinos from Merging Stellar-mass Black Holes in Active Galactic Nuclei Accretion Disk
Zhu, Jin-Ping.*
Monthly Notices of the Royal Astronomical Society: Letters, Volume 528, Issue 1, id.L88, 8 pp, 2024 (arXiv:2310.14255)

(5) Kilonova and Optical Afterglow from Binary Neutron Star Mergers. II. Optimal Search Strategy for Serendipitous Observations and Target-of-opportunity Observations of Gravitational-wave Triggers
Zhu, Jin-Ping.*, Wu, Shichao.*, Yang, Yuan-Pei.*, Liu, Chang., Zhang, Bing.*, Song, Hao-Ran., Gao, He., Cao, Zhoujian., Yu, Yun-Wei., Kang, Yacheng., Shao, Lijing
The Astrophysical Journal, Volume 942, Issue 2, id.88, 18 pp, 2023 (arXiv:2110.10469)

(6) Kilonova and Optical Afterglow from Binary Neutron Star Mergers. I. Luminosity Function and Color Evolution
Zhu, Jin-Ping.*, Yang, Yuan-Pei.*, Zhang, Bing.*, Gao, He., Yu, Yun-Wei.
The Astrophysical Journal, Volume 938, Issue 2, id.147, 13 pp, 2022 (arXiv:2110.10468)

(7) Long-duration Gamma-Ray Burst and Associated Kilonova Emission from Fast-spinning Black Hole-Neutron Star Binary Mergers
Zhu, Jin-Ping.*, Wang, Xiangyu Ivy., Sun, Hui., Yang, Yuan-Pei.*, Li, Zhuo.*, Hu, Rui-Chong., Qin, Ying., Wu, Shichao.
The Astrophysical Journal Letters, Volume 936, Issue 1, id.L10, 12 pp, 2022 (arXiv:2207.10470)

(8) Population Properties of Gravitational-wave Neutron Star–Black Hole Mergers
Zhu, Jin-Ping.*, Wu, Shichao.*, Qin, Ying., Zhang, Bing.*, Gao, He., Cao, Zhoujian.*
The Astrophysical Journal, Volume 928, Issue 2, id.167, 10 pp, 2022 (arXiv:2112.02605)

(9) No Detectable Kilonova Counterpart is Expected for O3 Neutron Star–Black Hole Candidates
Zhu, Jin-Ping.*, Wu, Shichao.*, Yang, Yuan-Pei., Zhang, Bing.*, Gao, He., Yu, Yun-Wei., Cao, Zhoujian.*, Liu, Liang-Duan.
The Astrophysical Journal, Volume 921, Issue 2, id.156, 9 pp, 2021 (arXiv:2106.15781)

(10) High-energy Neutrinos from Stellar Explosions in Active Galactic Nucleus Accretion Disks
Zhu, Jin-Ping.*, Wang, Kai.*, Zhang, Bing.*
The Astrophysical Journal Letters, Volume 917, Issue 2, id.L28, 7 pp, 2021 (arXiv:2107.06070)

(11) Kilonova Emission from Black Hole–Neutron Star Mergers. II. Luminosity Function and Implications for Target-of-opportunity Observations of Gravitational-wave Triggers and Blind Searches
Zhu, Jin-Ping.*, Wu, Shichao.*, Yang, Yuan-Pei., Zhang, Bing.*, Gao, He., Yu, Yun-Wei., Li, Zhuo., Cao, Zhoujian.*, Liu, Liang-Duan., Huang, Yan., Zhang, Xing-Han.
The Astrophysical Journal, Volume 917, Issue 1, id.24, 25 pp, 2021 (arXiv:2011.02717)

(12) Thermonuclear Explosions and Accretion-induced Collapses of White Dwarfs in Active Galactic Nucleus Accretion Disks
Zhu, Jin-Ping.*, Yang, Yuan-Pei., Zhang, Bing.*, Liu, Liang-Duan., Yu, Yun-Wei., Gao, He.
The Astrophysical Journal Letters, Volume 914, Issue 1, id.L19, 9 pp, 2021 (arXiv:2104.09389)

(13) High-energy Neutrinos from Choked Gamma-Ray Bursts in Active Galactic Nucleus Accretion Disks
Zhu, Jin-Ping.*, Wang, Kai., Zhang, Bing.*, Yang, Yuan-Pei., Yu, Yun-Wei., Gao, He.
The Astrophysical Journal Letters, Volume 911, Issue 2, id.L19, 6 pp, 2021 (arXiv:2103.00789)

(14) Neutron Star Mergers in Active Galactic Nucleus Accretion Disks: Cocoon and Ejecta Shock Breakouts
Zhu, Jin-Ping.*, Zhang, Bing.*, Yu, Yun-Wei.*, Gao, He.*
The Astrophysical Journal Letters, Volume 906, Issue 2, id.L11, 7 pp, 2021 (arXiv:2011.08428)

(15) Kilonova Emission from Black Hole–Neutron Star Mergers. I. Viewing-angle-dependent Lightcurves
Zhu, Jin-Ping.*, Yang, Yuan-Pei., Liu, Liang-Duan., Huang, Yan., Zhang, Bing.*, Li, Zhuo.*, Yu, Yun-Wei., Gao, He.
The Astrophysical Journal, Volume 897, Issue 1, id.20, 32 pp, 2020 (arXiv:2003.06733)

(16) Relativistic Astronomy. II. In-flight Solution of Motion and Test of Special Relativity Light Aberration
Zhu, Jin-Ping.*, Zhang, Bing.*, Yang, Yuan-Pei.
The Astrophysical Journal, Volume 877, Issue 1, id.14, 8 pp, 2019 (arXiv:1904.02056)

Coauthor publications (19 papers:):

(1) Stable Case BB/BC Mass Transfer to Form GW190425-like Massive Binary Neutron Star Mergers
Qin, Ying.*, **Zhu, Jin-Ping.**, Meynet, Georges., Zhang, Bing., Wang, Fa-Yin., Shu, Xin-Wen., Song, Han-Feng., Wang, Yuan-Zhu., Yuan, Liang., Wang, Zhen-Han-Tao., Hu, Rui-Chong., Wu, Dong-Hong., Yi, Shu-Xi., Tang, Qing-Wen.*, Wei, Jun-Jie., Wu, Xue-Feng., Liang, En-Wei.
Accepted by Astronomy & Astrophysics (arXiv:2409.10869)

(2) Propagation of GRB Relativistic Jets in AGN disks and Its Implication for GRB Detection
Zhang, Hao-Hui., **Zhu, Jin-Ping.**, Yu, Yun-Wei.*
Accepted by The Astrophysical Journal (arXiv:2406.10904)

(3) A Channel to Form Fast-spinning Black Hole–Neutron Star Binary Mergers as Multimessenger Sources. II. Accretion-induced Spin-up
Wang, Zhen-Han-Tao., Hu, Rui-Chong., Qin, Ying.*, **Zhu, Jin-Ping.***, Zhang, Bing., Yi, Shuang-Xi., Tang, Qin-Wen., Shu, Xin-Wen., Lyu, Fen., Liang, En-Wei.
The Astrophysical Journal, Volume 965, Issue 2, id.177, 13 pp, 2024 (arXiv:2401.17558)

(4) Prospects for Detecting Neutron star–White Dwarf Mergers with Decihertz Gravitational-wave Observatories
Kang, Yacheng., Liu, Chang., **Zhu, Jin-Ping.**, Gao, Yong., Shao, Lijing.*, Zhang, Bing.*, Sun, Hui., Yin, Yi-Han Iris., Zhang, Bin-Bin.
Monthly Notices of the Royal Astronomical Society, Volume 528, Issue 3, id.5309, 14 pp, 2024 (arXiv:2309.16991)

(5) What Powered the Kilonova-like Emission After GRB 230307A in the Framework of a Neutron Star–White Dwarf Merger?
Wang, Xiangyu Ivy., Yu, Yun-Wei.*, Ren, Jia., Yang, Jun., Zou, Ze-Chen., **Zhu, Jin-Ping.**
The Astrophysical Journal Letters, Volume 964, Issue 1, id.L19, 6 pp, 2024 (arXiv:2402.11304)

(6) Super-Eddington Accretion as a Possible Scenario to Form GW190425
Zhang, Wan-Ting., Wang, Zhen-Han-Tao., **Zhu, Jin-Ping.**, Hu, Rui-Chong., Shu, Xin-Wen., Tang, Qing-Wen., Yi, Shuang-Xi., Liang, En-Wei., Qin, Ying.*
Monthly Notices of the Royal Astronomical Society, Volume 526, Issue 1, id.854, 8 pp, 2023 (arXiv:2309.05189)

(7) Revisiting the Properties of GW190814 and Its Formation History
Lyu, Fen., Yuan, Liang., Wu, Dong-Hong., Guo, Weihua., Wang, Yuan-Zhu., Yi, Shuang-Xi., Tang, Qing-Wen.*, Hu, Rui-Chong., **Zhu, Jin-Ping.**, Shu, Xin-Wen., Qin, Ying.*, Liang, En-Wei.*
Monthly Notices of the Royal Astronomical Society, Volume 525, Issue 3, id.4321, 8 pp, 2023 (arXiv:2308.09893)

(8) Multi-messenger Detections of Binary Neutron Star Mergers Powered by Decihertz Gravitational-wave Observations
Kang, Yacheng., Liu, Chang., **Zhu, Jin-Ping.**, Shao, Lijing.*
SCIENTIA SINICA Physica, Mechanica & Astronomica , Volume 53, Issue 10, id.100014, 13 pp, 2023

(9) Polarization Signature of Companion-fed Supernovae Arising from BH–NS/BH Progenitor Systems
Wen, Xudong., Gao He.*, Ai Shunke.*, Liu, Liang-Duan., **Zhu, Jin-Ping.**, Lei, Wei-Hua.
The Astrophysical Journal, Volume 955, Issue 1, id.9, 12 pp. 2023 (arXiv:2308.11913)

(10) High-energy Neutrino Productions from AGN Disk Transients Impacted by Circum-disk Medium
Zhou, Zi-Hang., **Zhu, Jin-Ping.***, Wang, Kai.*
The Astrophysical Journal, Volume 951, Issue 1, id.74, 8 pp, 2023 (arXiv:2211.13953)

(11) A Population Study of the Radio Emission of Fast Blue Optical Transients
Liu, Jian-Feng., Liu, Liang-Duan.*, Yu, Yun-Wei.*, **Zhu, Jin-Ping.**
The Astrophysical Journal, Volume 946, Issue 1, id.35, 7 pp, 2023 (arXiv:2301.06403)

(12) Merging Binary Black Holes Formed through Double-core Evolution
Qin, Ying.*, Hu, Rui-Chong., Meynet, Georges., Wang, Yuan-Zhu., **Zhu, Jin-Ping.**, Song, Hanfeng., Shu, Xinwen., Wu, Shichao.
Astronomy & Astrophysics, Volume 671, id.A62, 15 pp, 2023 (arXiv:2301.04918)

(13) Searching for Candidates of Coalescing Binary Black Holes Formed through Chemically Homogeneous Evolution in GWTC-3

Qin, Ying.*, Wang, Yuan-Zhu.*, Bavera, Simone S.*, Wu, Shichao., Meynet, Georges., Wang, Yi-Ying., Hu, Rui-Chong., **Zhu, Jin-Ping.**, Wu, Dong-Hong., Shu, Xin-Wen., Pang, Fang-Kun., Song, Han-Feng., Wei, Da-Ming.
The Astrophysical Journal, Volume 941, Issue 2, id.179, 8 pp, 2023 (arXiv:2211.05945)

(14) Magnetar Engines in Fast Blue Optical Transients and Their Connections with SLSNe, SNe Ic-BL, and lGRBs
Liu, Jian-Feng., **Zhu, Jin-Ping.**, Liu, Liang-Duan.*, Yu, Yun-Wei.*, Zhang, Bing.
The Astrophysical Journal Letters, Volume 935, Issue 2, id.L34, 12 pp, 2022 (arXiv:2206.03303)

(15) A Channel to Form Fast-spinning Black Hole–Neutron Star Binary Mergers as Multi-messenger Sources
Hu, Rui-Chong., **Zhu, Jin-Ping.***, Qin, Ying.*, Zhang, Bing., Liang, En-Wei., Shao, Yong.
The Astrophysical Journal, Volume 928, Issue 2, id.163, 7 pp, 2022 (arXiv:2201.09549)

(16) Does a Long-lived Remnant Neutron Star Exist after Short Gamma-Ray Burst GRB 160821B?
Wu, Guang-Lei., Yu, Yun-Wei.*, **Zhu, Jin-Ping.**
Astronomy & Astrophysics, Volume 654, id.A124, 7 pp, 2021 (arXiv:2108.01349)

(17) Pair Separation in Parallel Electric Field of a Magnetar Magnetosphere and Narrow Spectra of Fast Radio Bursts
Yang, Yuan-Pei.*, **Zhu, Jin-Ping.**, Zhang, Bing.*, Wu, Xue-Feng.
The Astrophysical Journal Letters, Volume 901, Issue 1, id.L13, 6 pp, 2020 (arXiv:2006.03270)

(18) Relativistic Astronomy. III. Test Special Relativity via Doppler Effect
Yang, Yuan-Pei.*, **Zhu, Jin-Ping.**, Zhang, Bing.*
The Astrophysical Journal, Volume 883, Issue 2, id.159, 7 pp, 2019 (arXiv:1908.02985)

(19) A Statistical Study of Superluminous Supernovae Using the Magnetar Engine Model and Implications for their Connection with Gamma-Ray Bursts and Hypernovae
Yu, Yun-Wei.*, **Zhu, Jin-Ping.**, Li, Shao-Ze., Lü, Hou-Jun., Zou, Yuan-Chuan.
The Astrophysical Journal, Volume 840, Issue 1, id.12, 13 pp, 2017 (arXiv:1704.01682)

Conference proceedings (1 paper):

(1) Studying Newborn Neutron Stars by the Transient Emission after Stellar Collapses and Compact Binary Mergers
Yu, Yun-Wei.*, Chen, Aming., Dai, Zi-Gao., Li, Shao-Ze., Liu, Liang-Duan., **Zhu, Jin-Ping.**
AIP Conference Proceedings, Volume 2127, Issue 1, id.020024, 10 pp, 2019 (arXiv:1904.04440)

In review (2 papers):

(1) Electromagnetic and High-energy Neutrino Signals from Catastrophic Explosion Events in Active Galactic Nucleus Accretion Disks
Zhu, Jin-Ping.*, Yu, Yun-Wei., Zhang, Bing.
Submitted to Chinese Science Bulletin

(2) Formation of Fast-spinning Neutron Stars in Close Binaries and Magnetar-driven Stripped-envelope Supernovae
Hu, Rui-Chong. (co-first), **Zhu, Jin-Ping.*** (co-first), Qin, Ying.* (co-first), Shao, Yong.* (co-first), Zhang, Bing., Yu, Yun-Wei., Liang, En-Wei., Liu, Liang-Duan., Wang, Bo., Shu, Xin-Wen., Liu, Jian-Feng.
Submitted to Nature Communications (arXiv:2301.06402)