

KAI WANG 王凯

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RESEARCH INTERESTS

- Galaxy-Halo Connection: *galaxy group identification; secondary galaxy-halo connections*
- Dark Matter Halo: *protohalo; halo assembly bias; halo structure*
- Protoclusters: *protocluster identification; protocluster evolution*
- Galaxy Quenching: *environmental quenching; relation to the galaxy-halo connection*

WORKING EXPERIENCE

- KIAA Fellow, Kavli Institute for Astronomy and Astrophysics, **Peking University** since Jul. 2022

EDUCATION

- Ph.D. in Astronomy, **Tsinghua University** Sep. 2017 - Jul. 2022
Supervisors: Prof. Cheng Li & Prof. Houjun Mo, Thesis: Finding galaxy groups/clusters at $z \sim 1$ and its application
- Visiting Scholar, **University of Massachusetts, Amherst** Nov. 2019 - Oct. 2021
Supervisor: Prof. Houjun Mo
- B.S. in Astronomy, **University of Science and Technology of China (USTC)** Sep. 2013 - Jul. 2017

STUDENT MENTORSHIP

- Zeyu Gao, graduate at Peking University since Nov. 2022
Project: Decoding the SEDs of galaxies with a prior from hydrodynamical simulations
- Xunda Sun, graduate at the University of Chinese Academy of Sciences since Jun. 2023
Project: Characterizing the spatial distribution of the metal content for galaxies in FIRE2
- Jiaqi Wang, graduate at Shanghai Jiao Tong University since Dec. 2023
Project: Observational evidence of the halo assembly bias effect for protohalo size
- Zhijun Zhang, undergraduate at Peking University Sep. 2022 - Jun. 2023
Bachelor Thesis: Identify protoclusters from high-redshift photometric surveys

GRANTS

- KIAA fellow start-up research funding Jul. 2022 - Jul. 2024
50,000CNY
- China Scholarship for the Visiting Scholar Nov. 2019 - Oct. 2021
China Scholarship Council (CSC), \$45,600
- National Astronomy Training Base Jun. 2016 - Jun. 2017
Measure the conditional luminosity functions of galaxies at $z \sim 0.6$ using CLAUDS and BOSS, 20,000CNY
- National Astronomy Training Base May 2015 - May 2016
Thermal gravitational-wave background in the general pre-inflationary scenario, 20,000CNY

TEACHING

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| • Cosmology and Galaxy Evolution | Guest Lecturer, Peking University, Autumn 2023 |
| • Observational Cosmology | Teaching Assistant, Tsinghua University, Autumn 2017 |
| • Particle Cosmology | Teaching Assistant, USTC, Spring 2017 |
| • General Relativity | Teaching Assistant, USTC, Autumn 2016 |

HONORS AND AWARDS

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| • MUST Fellowship (declined) | 2022 |
| • Comprehensive scholarship (2nd class) of Tsinghua University | 2020 |
| • Comprehensive scholarship (1st class) of Tsinghua University | 2019 |
| • Future Scholar Scholarship of Tsinghua University | 2017 |
| • Outstanding Graduate of USTC | 2017 |
| • National Inspirational Award | 2016 |
| • Excellent Student Scholarship (Silver Award) | 2014 |
| • Excellent Student Scholarship (Bronze Award) | 2013 |

SERVICE

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| • Professional Service | |
| Referee for MNRAS, ApJ, and A&A | |
| • Departmental Service | |
| Faculty Candidate Interview Committee at KIAA, Postdoc Representative | 2022 |
| Co-organizer of weekly Galaxy Party at KIAA | 2023 |
| Co-organizer of the Postdoc Science Day at KIAA | 2022 |
| Co-organizer of the Speaker Lunch at the Tsinghua Center for Astrophysics | 2018-2019 |

SELECTED TALKS

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| • Galread: Princeton/IAS Galaxy Journal Club | |
| <i>Characterizing the assembly of dark matter halos with protohalo size histories</i> | Remote, Oct. 2023 |
| • UC Santa Cruz CGI (Cosmology/Galaxies/IGM) Seminar | |
| <i>Characterizing the assembly of dark matter halos with protohalo size histories</i> | Remote, Oct. 2023 |
| • Collaboration Workshop on Cosmology and Galaxy Formation | |
| <i>Relating Galaxies across Cosmic Time to study galaxy evolution</i> | Shanghai, Jun. 2023 |
| • 25th Chinese Astronomical Society Guoshoujing Symposium on Galaxies and Cosmology | |
| <i>Central Galaxy Quenching and its Relation to Halo Formation Time & Large-scale Environment</i> | Huangshan, May 2023 |
| • Conference of Star Formation and Nuclei Activity in Galaxies | |
| <i>Central Galaxy Quenching and its Relation to Halo Formation Time & Large-scale Environment</i> | Nanjing, Mar. 2023 |
| • KIAA-DoA Seminar, Peking University | |
| <i>Central Galaxy Quenching and its Relation to Halo Formation Time & Large-scale Environment</i> | Beijing, Mar. 2023 |
| • Lunch Talk at the Department of Astronomy, Tsinghua University | |
| <i>Relating galaxies across different redshift</i> | Beijing, Nov. 2022 |
| • Lunch Talk at Kavli-IPMU, University of Tokyo | |
| <i>Finding proto-clusters to trace galaxy evolution</i> | Remote, Jun. 2021 |
| • The 11-th Prime Focus Spectrograph collaboration meeting | |
| <i>Identifying galaxy groups from high-z and incomplete spectroscopic surveys</i> | Pasadena, Dec. 2019 |
| • The 10-th Prime Focus Spectrograph collaboration meeting | |
| <i>Finding groups/clusters of galaxies in the PFS galaxy evolution survey</i> | Shanghai, Dec. 2018 |

PUBLICATION

♦ **23** publications; **10** as the first/corresponding author; **173** citations; *H*-index: **7**

♦ [Open in NASA/ADS Library](#)

First/Corresponding author papers:*

1. **Kai Wang**, Houjun Mo, Yangyao Chen, Joop Schaye, MNRAS accepted (2023) [arXiv: 2310.00200]
An efficient and robust method to estimate halo concentration based on the method of moments
2. **Kai Wang**, Houjun Mo, Yangyao Chen, et al. submitted to MNRAS (2023) [arXiv: 2309.01039]
Characterize the assembly of dark matter halos with protohalo size histories: I. Redshift evolution, relation to descendant halos, and halo assembly bias
3. **Kai Wang**, Xin Wang, Yangyao Chen, ApJ, 951, 66 (2023) [arXiv: 2305.08161]
Environmental dependence of the mass-metallicity relation in cosmological hydrodynamical simulations
4. **Kai Wang**, Yangyao Chen, Qingyang Li, Xiaohu Yang, MNRAS, 522, 3188 (2023) [arXiv: 2304.07189]
Late-formed halos prefer to host quiescent central galaxies. I. Observational results
5. **Kai Wang**, Yingjie Peng, Yangyao Chen, MNRAS 523, 1268 (2023) [arXiv: 2304.06886]
Dissect two-halo galactic conformity effect: The dependence of star formation activities on the large-scale environment for central galaxies
6. **Kai Wang**, Houjun Mo, Cheng Li, Yangyao Chen, MNRAS 520, 1774 (2023) [arXiv: 2211.00485]
Relating galaxies across different redshift to study galaxy evolution
7. **Kai Wang**, Houjun Mo, Cheng Li, Yangyao Chen, MNRAS 505, 3892 (2021) [arXiv: 2104.12223]
Finding proto-clusters to trace galaxy evolution: I. The finder and its performance
8. **Kai Wang**, Houjun Mo, Cheng Li, Jiacheng Meng, Yangyao Chen, MNRAS 499, 89 (2020)
Identifying galaxy groups at high redshift from incomplete spectroscopic data: I. The group finder and application to zCOSMOS
9. **Kai wang**, Larissa Santos, Jun-Qing Xia, Wen Zhao, JCAP 01, 053 (2017) [arXiv: 1608.04189]
Thermal gravitational-wave background in the general pre-inflationary scenario
10. Yi-Fan Wang, **Kai Wang***, Wen Zhao, RAA 16, 4 (2016) [arXiv: 1511.01220]
Smoothing methods comparison for CMB E- and B-mode separation

Co-author papers:

11. Tao Wang et al. Submitted to Nature (2023) [arXiv: 2311.07653]
Black holes regulate cold gas accretion in massive galaxies
12. Yangyao Chen, H.J Mo, **Kai Wang**, MNRAS 526, 2542 (2023) [arXiv: 2304.13890]
Massive Dark Matter Halos at High Redshift: Implications for Observations in the JWST Era
13. Cheqiu Lyu et al. ApJ 959, 5 (2023) [arXiv: 2310.10733]
From Halos to Galaxies. VII. The Connections Between Stellar Mass Growth History, Quenching History, and Halo Assembly History for Central Galaxies
14. Jiacheng Meng et al. Submitted to ApJ (2023) [arXiv: 2008.13733]
Measuring galaxy abundance and clustering at high redshift from incomplete spectroscopic data: Tests on mock catalogs
15. Yangyao Chen et al. MNRAS 525, 1254 (2023) [arXiv: 2301.08972]
A Conditional Abundance Matching Method of Extending Simulated Halo Merger Trees to Resolve Low-Mass Progenitors and Sub-halos
16. Qingyang Li et al. ApJ 933, 9 (2022) [arXiv: 2205.05517]
Groups and Protocluster Candidates in the CLAUDS and HSC-SSP Joint Deep Surveys
17. Yangyao Chen et al. MNRAS 507, 2510 (2021) [arXiv: 2106.03984]
MAHGIC: A Model Adapter for the Halo-Galaxy Inter-Connection
18. Zhaoyu Wang et al. Sci. China Phys. Mech. Astron. 64, 289811 (2021) [arXiv: 2106.14159]
The clustering of galaxies in the DESI imaging legacy surveys DR8: I. the luminosity and color dependent intrinsic clustering

19. Yangyao Chen et al. MNRAS 504, 4865 (2021) [[arXiv: 2009.12467](#)]
How to empirically model star formation in dark matter halos: I. Inferences about central galaxies from numerical simulations
20. Yangyao Chen et al. ApJ, 899, 81 (2020) [[arXiv: 2003.05137](#)]
Relating the structure of dark matter halos to their assembly and environment
21. Jia-Ni Ye, **Kai Wang**, Yi-Fu Cai, Eur. Phys. J. C 77:720 (2017) [[arXiv: 1705.10956](#)]
Superconducting cosmic strings as sources of cosmological fast radio bursts
22. Larissa Santo et al. JCAP, 01, 043 (2017) [[arXiv: 1612.03564](#)]
Statistical imprints of CMB B-type polarization leakage in an incomplete sky survey analysis
23. Larissa Santo et al. JCAP 07, 029 (2016) [[arXiv: 1510.07779](#)]
Probing the statistical properties of CMB B -mode polarization through Minkowski Functionals

REFERENCES

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| <ul style="list-style-type: none"> • Prof. Houjun Mo
✉ hjmo@umass.edu | University of Massachusetts, Amherst |
| <ul style="list-style-type: none"> • Prof. Cheng Li
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