

KAI WANG | 王凯

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RESEARCH

- **Galaxy-Halo Connection:** galaxy group identification; secondary galaxy-halo connections
- **Dark Matter Halo:** halo assembly history; halo bias; halo structure
- **Galaxy Quenching:** environmental quenching; relation to halo assembly history

EXPERIENCE

- Postdoctoral Research Associate, ICC and CEA, **Durham University** Since Jul. 2024
- KIAA Fellow, Kavli Institute for Astronomy and Astrophysics, **Peking University** Jul. 2022 - Jun. 2024

EDUCATION

- Ph.D. in Astronomy, **Tsinghua University** Sep. 2017 - Jul. 2022
Supervisors: Cheng Li & 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: Houjun Mo
- B.S. in Astronomy, **University of Science and Technology of China (USTC)** Sep. 2013 - Jul. 2017

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 (\$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)

MENTORSHIP

- **Zeyu Gao**, graduate at Peking University since Nov. 2022
Project: Decoding the SEDs of galaxies with a prior from hydrodynamical simulations [\[in prep.\]](#)
- **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 [\[in prep.\]](#)
- **Chengyu Ma**, graduate at USTC since Dec. 2023
Project: Revisiting the fundamental metallicity relation with observation and simulation [\[arXiv: 2407.21716\]](#)
- **Haochen Jiang**, undergraduate at USTC since Dec. 2023
Project: Dissecting the quenching of massive central galaxies in TNG [\[in prep.\]](#)

- **Jiaqi Wang**, graduate at Shanghai Jiao Tong University Dec. 2023 - Aug. 2024
Project: Observational evidence of the halo assembly bias effect for protohalo size [\[in prep.\]](#)
- **Zhijun Zhang**, undergraduate at Peking University Sep. 2022 - Jun. 2023
Bachelor Thesis: Identify protoclusters from high-redshift photometric surveys

TEACHING

- 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

- T. D. Lee Postdoctoral Fellowship (declined) 2024
- 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
- The annual scholarship of National Astronomical Observatories, CAS 2016
- National Inspirational Award 2016
- Excellent Student Scholarship (Silver Award) 2014
- Excellent Student Scholarship (Bronze Award) 2013

SERVICE

- **Professional Service**
Referee for MNRAS, ApJ, and A&A
- **Departmental Service**
Faculty Candidate Interview Committee at KIAA, Postdoc Representative 2023, 2024
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

TALKS

- Galaxy & Cosmology seminar at Tsinghua University
Dark matter halo and its structure, assembly, and clustering Beijing, May 2024
- Lunch talk at South-Western Institute For Astronomy Research, Yunnan University
Galaxy formation within and without dark matter halos Kunming, Apr. 2024
- Conference of the Co-evolution of galactic eco-systems and their large-scale environments
Dissecting two-halo galactic conformity effect for central galaxies Hangzhou, Apr. 2024
- Astronomical Seminar at the Huazhong University of Science and Technology
Galaxy formation within and without dark matter halos Wuhan, Mar. 2024

- ITC Luncheon
How to connect galaxies across cosmic time? Cambridge, Jan. 2024
- Steward/NOIRLab Galaxy Group Talk
How to connect galaxies across cosmic time? Tucson, Jan. 2024
- Carnegie arXiv Tea
Relating galaxies across different redshift to study galaxy evolution Pasadena, Jan. 2024
- KIPAC tea talk at Stanford University
Characterizing the assembly of dark matter halos with protohalo size histories Stanford, Jan. 2024
- UC Santa Cruz CGI (Cosmology/Galaxies/IGM) Seminar
Central Galaxy Quenching and its Relation to Halo Formation Time & Large-scale Environment Santa Cruz, Jan. 2024
- Galread: Princeton/IAS Galaxy Journal Club
Characterizing the assembly of dark matter halos with protohalo size histories Remote, Oct. 2023
- UC Santa Cruz CGI (Cosmology/Galaxies/IGM) Seminar
Characterizing the assembly of dark matter halos with protohalo size histories Remote, Oct. 2023
- The 2nd Shanghai Assembly on Cosmology and Structure Formation
Characterizing the assembly of dark matter halos with protohalo size histories Shanghai, Oct. 2023
- Collaboration Workshop on Cosmology and Galaxy Formation
Relating Galaxies across Cosmic Time to study galaxy evolution Shanghai, Jun. 2023
- 25th Chinese Astronomical Society Guoshoujing Symposium on Galaxies and Cosmology
Central Galaxy Quenching and its Relation to Halo Formation Time & Large-scale Environment Huangshan, May 2023
- Conference of Star Formation and Nuclei Activity in Galaxies
Central Galaxy Quenching and its Relation to Halo Formation Time & Large-scale Environment Nanjing, Mar. 2023
- KIAA-DoA Seminar, Peking University
Central Galaxy Quenching and its Relation to Halo Formation Time & Large-scale Environment Beijing, Mar. 2023
- Lunch Talk at the Department of Astronomy, Tsinghua University
Relating galaxies across different redshift Beijing, Nov. 2022
- Lunch Talk at Kavli-IPMU, University of Tokyo
Finding proto-clusters to trace galaxy evolution Remote, Jun. 2021
- The 11-th Prime Focus Spectrograph collaboration meeting
Identifying galaxy groups from high-z and incomplete spectroscopic surveys Pasadena, Dec. 2019
- The 10-th Prime Focus Spectrograph collaboration meeting
Finding groups/clusters of galaxies in the PFS galaxy evolution survey Shanghai, Dec. 2018

PUBLICATION

◆ **26** publications; **11** as the first/corresponding author; **220** citations; *H*-index: **8**

◆ [Open in NASA/ADS Library](#)

First-author/Corresponding-author* papers:

1. Chengyu Ma, **Kai Wang***, Enci Wang*, et al. ApJL (2024) [[arXiv: 2407.21716](#)]
Revisiting the fundamental metallicity relation with observation and simulation
2. **Kai Wang**, Houjun Mo, Yangyao Chen, Joop Schaye, MNRAS, 527, 10760 (2023) [[arXiv: 2310.00200](#)]
An efficient and robust method to estimate halo concentration based on the method of moments
3. **Kai Wang**, Houjun Mo, Yangyao Chen, et al. MNRAS, 528, 2046 (2024) [[arXiv: 2309.01039](#)]
Characterizing the assembly of dark matter halos with protohalo size histories: I. Redshift evolution, relation to descendant halos, and halo assembly bias

4. **Kai Wang**, Xin Wang, Yangyao Chen, ApJ, 951, 66 (2023) [arXiv: 2305.08161]
Environmental dependence of the mass-metallicity relation in cosmological hydrodynamical simulations
5. **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
6. **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
7. **Kai Wang**, Houjun Mo, Cheng Li, Yangyao Chen, MNRAS 520, 1774 (2023) [arXiv: 2211.00485]
Relating galaxies across different redshift to study galaxy evolution
8. **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
9. **Kai Wang**, Houjun Mo, Cheng Li, Jiacheng Meng, Yangyao Chen, MNRAS 499, 89 (2020) [arXiv: 2006.05426]
Identifying galaxy groups at high redshift from incomplete spectroscopic data: I. The group finder and application to zCOSMOS
10. **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
11. 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:

12. Cheqiu Lyu et al. ApJ (2024) [arXiv: 2407.03409]
From Halos to Galaxies. IX. Accurate estimate of halo assembly history for SDSS galaxy groups
13. Qinxun Li et al. ApJL 969 L25 (2024) [arXiv: 2402.10740]
Black-Hole-to-Halo Mass Relation From UNIONS Weak Lensing
14. Tao Wang et al. Nature (2023) [arXiv: 2311.07653]
Black holes regulate cold gas accretion in massive galaxies
15. 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
16. 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
17. Jiacheng Meng et al. ApJ 964, 2 (2024) [arXiv: 2008.13733]
Measuring galaxy abundance and clustering at high redshift from incomplete spectroscopic data: Tests on mock catalogs
18. 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
19. Qingyang Li et al. ApJ 933, 9 (2022) [arXiv: 2205.05517]
Groups and Protocluster Candidates in the CLAUDS and HSC-SSP Joint Deep Surveys
20. Yangyao Chen et al. MNRAS 507, 2510 (2021) [arXiv: 2106.03984]
MAHGIC: A Model Adapter for the Halo-Galaxy Inter-Connection
21. 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

22. 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

23. Yangyao Chen et al. ApJ, 899, 81 (2020) [[arXiv: 2003.05137](#)]

Relating the structure of dark matter halos to their assembly and environment

24. 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

25. 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

26. Larissa Santo et al. JCAP 07, 029 (2016) [[arXiv: 1510.07779](#)]

Probing the statistical properties of CMB B -mode polarization through Minkowski Functionals

REFERENCES

- Prof. Houjun Mo
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