Hai-Xia Ma

Nagoya University, Japan | ma.haixia.k8@s.mail.nagoya-u.ac.jp | Homepage

Research Interests

Active Galactic Nuclei; Infrared Galaxies; Computational methods; High-Redshift Galaxies; Quasar-Galaxy Pairs; Machine Learning; Galactic Dynamics; Galaxy Clusters; Galaxy Formation and Evolution; Dark Matter; Fuzzy Dark Matter; Milky Way Structure; James Webb Space Telescope; ALMA; Subaru; Gaia; LAMOST; SDSS.

Education & Appointments

Nagoya University, Doctor of Science Science — Oct. 2022 - present; Nagoya, Japan

- Advisor: Prof. Tsutomu T. Takeuchi

Nagoya University, Master of Science — Oct. 2020 - Spet. 2022; Nagoya, Japan

- Advisor: Prof. Tsutomu T. Takeuchi
- Thesis: *Understanding the Origin of Multi-Scale Mass Distribution in the Universe: from Stars to Galaxies*

Yunnan Observatories, Chinese Academy of Sciences, Research Assistant — July. 2019 - Sept. 2020; Yunnan, China

- Advisor: Prof. Xiao-Bo Dong

University of Science and Technology of China, Bachelor of Astronomy — Sept. 2015 - Jun. 2019; Hefei, China

- Advisor: Prof. Xiao-Bo Dong
- Thesis: *Tests of Gravity Theories in the Andromeda Galaxy.*

Publications

ORCiD: 0000-0002-5237-9433

ADS link: https://ui.adsabs.harvard.edu/search/q=orcid

First-Author

sOPTICS: a modified density-based algorithm for identifying galaxy groups/clusters and brightest cluster galaxies — Jan 2025

Hai-Xia Ma; Tsutomu T Takeuchi; Suchetha Cooray; Yongda Zhu

DOI: 10.1093/mnras/staf115

How close dark matter haloes and MOND are to each other: three-dimensional tests based on Gaia DR2 — Jan 2023

Yongda Zhu; **Hai-Xia Ma (Co-first Author)**; Xiao-Bo Dong; Yang Huang; Tobias Mistele; Bo Peng; Qian Long; Tianqi Wang; Liang Chang; Xi Jin

DOI: 10.1093/mnras/stac3483

Co-Author

A Promise for the JWST era: Massive black holes directly collapsed from wave dark matter haloes, and Star formation in and around their accretion flows — Aug 2025

Xiaobo, Dong; Yongda Zhu; Marcia Rieke; Rieke, George; Xinuy Li; Peter, Behroozi; **Hai-Xia Ma**; Runyu Meng; Zhiyinh Mao; Zhe Sun

DOI: 10.48550/arXiv.2508.092585

Quasar Radiative Feedback May Suppress Galaxy Growth on Intergalactic Scales at $z = 6.3$ Aug 2025

Yongda Zhu; Egami, Eiichi; Xiaohui Fan; Fengwu Sun; George D. Becker; ... **Hai-Xia Ma**; ...

DOI: 10.48550/arXiv.2509.00153

Nuclear Winds Drive Cold Gas Outflows on Kiloparsec Scales in Reionization-Era Quasars Apr 2025

Yongda Zhu; Marcia J. Rieke; Luis C. Ho; Yang Sun; George H. Rieke; Feng Yuan; Tom J. L. C. Bakx; George D. Becker; ... **Hai-Xia Ma**; ...

DOI: 10.48550/arXiv.2504.02305

Discovery of a Unique Close Quasar–DSFG Pair Linked by a [C II] Bridge at z = 5.63 Nov 2024

Yongda Zhu; Tom J. L. C. Bakx; Ryota Ikeda; Hideki Umehata;George D. Becker; ... **Hai-Xia Ma**; ...

DOI: 10.3847/2515-5172/ad91ad

Probing Ultralate Reionization: Direct Measurements of the Mean Free Path over $5 < z < 6$ Sept 2023

Yongda Zhu; George D. Becker; Holly M. Christenson; Anson D'Aloisio; Sarah E. I. Bosman; Tom J. L. C. Bakx; ... **Hai-Xia Ma**; ...

DOI: 10.3847/1538-4357/aceef4

Characterizing and understanding galaxies with two parameters Jul 2023

Suchetha Cooray; Tsutomu T Takeuchi; Daichi Kashino; Shuntaro A Yoshida; **Hai-Xia Ma**

DOI: 10.1093/mnras/stad2129

Observation Experience & Proposal Involvement

Selected projects

ALMA - Cycle 11 (PI: Zhu) – Galaxy over/under-densities around IGM transmission at z=5.7: a robust constraint on reionization

ALMA - Cycle 9 (PI: Zhu) – The Mean Free Path of Ionizing Photons at z = 5.6: A Robust Constraint on Reionization

Technical Proficiency

Programming: C++, C, Python, Julia, CUDA, SQL, etc.

Software: CASA, CARTA, Gadget-4, GALAXY, FreeFem++, etc.

Language: English (professional), Japanese (conversational), Chinese (native).

Awards, Fellowships, & Grants

THERS Make New Standards Program for the Next Generation Researchers Fellowship, Nagoya University — FY2024, 3,740,000 JPY

Student PI of Innovation Training Programs for Undergraduate, Chinese Academy of Sciences — FY2018, 20,000 CNY

Outstanding Student Scholarship, University of Science and Technology of China — FY2018, 2,000 CNY

Outstanding Student Scholarship, University of Science and Technology of China — FY2015, 2,000 CNY

Presentations

Evidence for an Oblate Core-like Dark Matter Halo in the Milky Way: Constraints from Gaia DR3 and LAMOST DR8 Aug. 2025
Poster Presentation: 11th Galaxy Evolution Workshop. Nagoya, Japan

Revisiting The Small-Scale Crises Of ΛCDM: New Perspectives And Insights Feb. 2025
*__Invited Talk__: 152nd Tsukuba Uchu Forum. Tsukuba, Japan

Addressing the Crises of the ΛCDM Model on Galactic Scales. Nov. 2024
Oral Presentation: First Star First Galaxy Workshop 2024. Nagano, Japan

A Slightly Oblate Dark Matter Halo with a Core-like Inner Density Profile Revealed by Fine-Stratified Stellar Populations from Gaia DR3. Oct. 2024
Oral Presentation: Kashiwa-no-ha Dark Matter and Cosmology Symposium. Tokyo, Japan

Couplings between dark matter and baryonic matter on galactic scales in Gaia DR3. Oct. 2024
Oral Presentation: COSMO'24. Kyoto, Japan

Unveiling the Shape of the Milky Way's Dark Matter Halo: Resolving the Small-Scale Challenges of CDM. Oct. 2024
Talk at NAOJ Subaru Telescope Group. Tokyo, Japan

Density-based clustering algorithm for galaxy group/cluster identification. Sep. 2024
Poster: First Results from the SRG/eROSITA All-Sky Survey: From Stars to Cosmology. Garching, Germany

Investigating the Temporal Evolution of Large-Scale Structure in the Universe via Topological Approaches. Jul. 2023
Poster: TDA Week 2023. Kyoto, Japan

Couplings between dark matter and baryonic matter on galactic scales: the radial vs. vertical. Jun. 2023
Oral Presentation: Celebrating 40 years of Milgromian dynamics and charting the road ahead. St Andrews, UK

Galaxy Cluster and Group Finding via Unsupervised Clustering. Feb. 2023
Oral Presentation: 9th Galaxy Evolution Workshop. Kyoto, Japan

Cluster Finding via Unsupervised Machine Learning. Feb. 2022
Poster: 8th Galaxy Evolution Workshop. Online

Tests of MOND and CDM on Galactic-scale. Feb. 2021
Poster: 7th Galaxy Evolution Workshop. Online