Lingrui Lin, Ph.D. student

I am a Ph.D. student from the School of Astronomy and Space Science of Nanjing University (NJU). I am very easy-going and open-minded, so please feel free to contact me.
[*Last update: Oct 7, 2025*]

Work: lingruiphd@smail.nju.edu.cn lingruiism@gmail.com
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Education

2021 – present **Ph.D. student, School of Astronomy and Space Science, Nanjing University**
Goal: *Gas dynamics and star formation of galaxies across the near and far Cosmic time*
Supervisors: *Zhi-Yu Zhang (NJU), Federico Lelli (INAF), Carlos De Breuck (ESO)*

2017 – 2021 **B.Sc., School of Astronomy and Space Science, Nanjing University**
Thesis: *Kinematics of atomic gas in supernova remnant IC 443*
Supervisor: *Zhi-Yu Zhang*

Research Experience

Sep 8, 2025 – present **Visiting Ph.D. student,** Arcetri Astrophysical Observatory (INAF), Florence, Italy
Topic: *Cold gas dynamics of rotating disk galaxies at redshift of 4 - 5*
Host: *Federico Lelli*

Oct 1, 2023 – Dec 22, 2023 **Early-Career Scientific Visitor,** European Southern Observatory (ESO), Garching bei München, Germany
Topic: *[C I] kinematics of a high-z radio galaxy: PKS 0529-549*
Host: *Carlos De Breuck*

Sep 23, 2023 – Sep 30, 2023 **Visitor,** Arcetri Astrophysical Observatory (INAF), Florence, Italy
Topic: *[C I] kinematics of a high-z radio galaxy: PKS 0529-549*
Host: *Federico Lelli*

Awards

2018-2020 Top Talent Program Scholarship × 3
2018 National Encouragement Scholarship
National College Mathematics Competition (Second prize, Non-Mathematics Major)
2019 Annual Scholarship of National Astronomical Observatory, Chinese Academy of Sciences
Renmin Scholarship
2021 Linqiao Scholarship (Linbridge Fund, Douglas Nelson Chao Lin)
Outstanding Undergraduate Graduate
President's Special Scholarship for Doctoral Students

Responsibilities

2017 – 2018 Publicity Department Member, Student Union of NJU Astronomy
Representative for Studies, NJU Astronomy Class 2017

Responsibilities (continued)

2018 – 2021	Monitor, NJU Astronomy Class 2017
2018 – 2019	Leader, Academic Division of NJU Great Astronomy Fans Association (NJU GAFA)
	Captain, NJU Astronomy Table Tennis team
2022 – 2023	Organization Member, Graduate Student Committee of NJU Astronomy
2024 Spring	Teaching Assistant of "Interstellar Medium", NJU Astronomy
2025 Spring	Teaching Assistant of "Astronomical Literature — Reading and Writing", NJU Astronomy

Publications

Refereed papers

1. **L. Lin**, F. Lelli, C. De Breuck, A. Man, Z.-Y. Zhang, P. Santini, A. Marasco, M. Castellano, N. Nesvadba, T. G. Bisbas, H.-T. Huang, and M. Lehnert, "Gas dynamics in an AGN-host galaxy at $z \simeq 2.6$: Regular rotation, noncircular motions, and mass models," *Astron. Astrophys.*, vol. 693, A91, A91, Jan. 2025. DOI: 10.1051/0004-6361/202450814. arXiv: 2411.08958 [astro-ph.GA].

2. **L. Lin**, Z.-Y. Zhang, J. Wang, P. P. Papadopoulos, Y. Shi, Y. Gong, Y. Sun, Y. Sun, T. G. Bisbas, D. Romano, D. Li, H. B. Liu, K. Qiu, L. Liu, G. Luo, C.-W. Tsai, J. Wu, S. Feng, and B. Zhang, "Inadequate turbulent support in low-metallicity molecular clouds," *Nature Astronomy*, vol. 9, pp. 406–416, Mar. 2025. DOI: 10.1038/s41550-024-02440-3. arXiv: 2501.07636 [astro-ph.GA].

3. W. Wang, C. De Breuck, D. Wylezalek, J. Vernet, M. D. Lehnert, D. Stern, D. S. N. Rupke, N. P. H. Nesvadba, A. Vayner, N. L. Zakamska, **L. Lin**, P. Kukreti, B. Dall'Agnol de Oliveira, and J. T. Groth, "JWST + ALMA ubiquitously discover companion systems within $\lesssim$18 kpc around four $z \approx 3.5$ luminous radio-loud AGN," *Astron. Astrophys.*, vol. 696, A88, A88, Apr. 2025. DOI: 10.1051/0004-6361/202553668. arXiv: 2502.20442 [astro-ph.GA].

4. H.-T. Huang, A. W. S. Man, F. Lelli, C. De Breuck, L. Ghodsi, Z.-Y. Zhang, **L. Lin**, J. Zhou, T. G. Bisbas, and N. P. H. Nesvadba, "Molecular Gas Mass Measurements of an Active, Starburst Galaxy at $z \approx 2.6$ Using ALMA Observations of the [C I], CO, and Dust Emission," *Astrophys. J.*, vol. 977, no. 2, 251, p. 251, Dec. 2024. DOI: 10.3847/1538-4357/ad9021. arXiv: 2411.04290 [astro-ph.GA].

5. F. Li, Z.-Y. Zhang, J. Wang, G. Luo, **L. Lin**, and J. Zhou, "Dense gas properties around the centre of the Circinus galaxy," *Mon. Not. R. Astron. Soc.*, vol. 527, no. 1, pp. 531–543, Jan. 2024. DOI: 10.1093/mnras/stad3241.

6. G. Luo, D. Li, Z.-Y. Zhang, T. G. Bisbas, N. Tang, **L. Lin**, Y. Sun, P. Zuo, and J. Zhou, "The CO-dark molecular gas in the cold H I arc," *Astron. Astrophys.*, vol. 685, L12, p. L12, May 2024. DOI: 10.1051/0004-6361/202450067. arXiv: 2405.02055 [astro-ph.GA].

7. Y. Sun, Z.-Y. Zhang, J. Wang, **L. Lin**, P. P. Papadopoulos, D. Romano, S. Feng, Y. Sun, B. Zhang, and F. Matteucci, "An improved method to measure $^{12}C/^{13}C$ and $^{14}N/^{15}N$ abundance ratios: revisiting CN isotopologues in the Galactic outer disc," *Mon. Not. R. Astron. Soc.*, vol. 527, no. 3, pp. 8151–8192, Jan. 2024. DOI: 10.1093/mnras/stad3643. arXiv: 2311.12971 [astro-ph.GA].

8. Y. Deng, Z.-Y. Zhang, P. Zhou, J. Wang, M. Fang, **L. Lin**, F. Bian, Z. Chen, Y. Shi, G. Chen, and H. Li, "Multiple gas phases in supernova remnant IC 443: mapping shocked H_2 with VLT/KMOS," *Mon. Not. R. Astron. Soc.*, vol. 518, no. 2, pp. 2320–2340, Jan. 2023. DOI: 10.1093/mnras/stac3139. arXiv: 2210.16909 [astro-ph.GA].

9. F. Lelli, Z.-Y. Zhang, T. G. Bisbas, **L. Lin**, P. Papadopoulos, J. M. Schombert, E. Di Teodoro, A. Marasco, and S. S. McGaugh, "Cold gas disks in main-sequence galaxies at cosmic noon: Low turbulence, flat rotation curves, and disk-halo degeneracy," *Astron. Astrophys.*, vol. 672, A106, A106, Apr. 2023. DOI: 10.1051/0004-6361/202245105. arXiv: 2302.00030 [astro-ph.GA].

10 G. Luo, Z.-Y. Zhang, T. G. Bisbas, D. Li, N. Tang, J. Wang, P. Zhou, P. Zuo, N. Yue, J. Zhou, and **L. Lin**, "Dependence of Chemical Abundance on the Cosmic-Ray Ionization Rate in IC 348," *Astrophys. J.*, vol. 942, no. 2, 101, p. 101, Jan. 2023. DOI: 10.3847/1538-4357/aca657. arXiv: 2211.13380 [astro-ph.GA].

11 L. Zhang, Z.-Y. Zhang, J. W. Nightingale, Z.-C. Zou, X. Cao, C.-W. Tsai, C. Yang, Y. Shi, J. Wang, D. Xu, **L.-R. Lin**, J. Zhou, and R. Li, "Discovery of a radio jet in the Cloverleaf quasar at z = 2.56," *Mon. Not. R. Astron. Soc.*, vol. 524, no. 3, pp. 3671–3682, Sep. 2023. DOI: 10.1093/mnras/stad2069. arXiv: 2212.07027 [astro-ph.GA].

Conference Proceedings

1 C. De Breuck, B. Emonts, W. Wang, D. Wylezalek, **L. Lin**, H. H. T. Huang, A. W. S. Man, and S. Kolwa, "ALMA observations of high redshift radio galaxies," in *ALMA at 10 years: Past, Present, and Future*, Dec. 2023, 50, p. 50. DOI: 10.5281/zenodo.10244516.

Telescope Projects

As the leading contributor

ALMA	*An ACA census of Galactic metal-poor molecular clouds (2021)*
IRAM NOEMA	*Resolving the gravity-dominated molecular clouds in the outer Galaxy (2023)*
SMA	*Galactic metal-poor molecular clouds on sub-pc scales (2022)*
IRAM 30-m	*Pebble-sized dust grains in Galactic metal-poor molecular clouds (2020)*
	Dynamic states of molecular clouds in the outer Galaxy (2022)
JCMT	*Exploring the low dust emissivity index of Galactic metal-poor molecular clouds (2021)*
	Dust in shocked regions of Supernova remnant IC 443 (2022)
	Sub-virial molecular clouds in the outer Milky Way on core to parsec scales: Short-spacing for the SMA (2022)
SMT	*Dynamic states of molecular clouds in the outer Galaxy (2022)*
FAST	*Measuring H I Fraction in Galactic Metal-poor Molecular Clouds (2021)*
	A HINSA census towards metal-poor molecular clouds in the Galactic far outer disk (2024)
	First measurement of HINSA Zeeman effect in the metal-poor Galactic outer disk (2024)
GBT 100-m	*Mapping the CO-dark molecular gas in the outer Galaxy (2023)*
	Resolving the turbulence-deficient molecular clouds in the outer Galaxy (2024)
Effelsberg 100-m	*CO-dark molecular gas in the outer Galaxy (2023)*

As an active collaborator (selected)

ALMA	*Cold gas and dark matter in massive galaxies at* $z = 4 - 5$
	Ultradeep C II observations of rotating gas disks at $z = 4 - 5$
	Measuring CNO isotopic ratios in the Galactic Outer Disk
FAST	*Atomic Clouds Driven by Galactic Nuclear Wind*
VLA	*Cold gas and dark matter in massive galaxies at* $z = 4 - 5$
GBT 100-m	*An OH and CH survey of the molecular clouds in the outer-disk of the Milky Way*

Skills

Astronomical Expertise

Radio astronomy	Observation (remote observation for SMT, GBT, and Effelsberg)
	Data reduction (spectrometer and bolometer; single dish and interferometer)
	Single dish and interferometry data combination in U-V plane
Astronomical Tools	*Proficient usage:* GILDAS/CLASS, CASA, CARTA, DS9, ^{3D}BAROLO, `vcdisk`, Astropy, Photutils, MONTAGE
	Basic usage: GILDAS/PIIC, Starlink, MIR, Glue
Code development	**See more on GitHub: Astronlin** *Highlight: (a)* A Python-based pipeline (FAST InterStellar H I, FISH) to calibrate the raw data of FAST 500-m telescope; *(b)* An MCMC-based H INSA fitting code

Technical Skills

Coding	Python (proficient), Fortran (basic), C++ (basic), IDL (basic), HTML (basic)
Operating System	Linux (I am a maintainer of the Ubuntu/CentOS servers and the remote connection in the NJU group), Mac OS (PC), Windows (PC)
Text Editor	Vim (proficient), LaTeX (proficient), Microsoft Word (proficient)

Miscellaneous

Languages	Mandarin Chinese (Native), English (Fluent)
Sports	Table tennis/ping-pong (advanced), Swimming (proficient), Basketball (competent), Badminton (competent), Tennis (novice)
Photograph	Adobe Photoshop/Camera Raw, Adobe Premiere