Niu LIU (刘牛)

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RESEARCH INTEREST

- **High-Precision Reference System and Frame**
- **Multiwavelength astrometry**

EDUCATION

School of Astronomy & Space Science, Nanjing University — Nanjing, China
Ph.D. in Astronomy — 2015.09 – 2020.06
Dissertation: *Overall properties of the ICRF and Gaia-CRF (in Chinese)*
Academic advisor: *Prof. Zi ZHU*

SYRTE, Observatoire de Paris — Paris, France
Joint Ph.D. program on the astrometric/geodetic VLBI data analysis — 2017.11 – 2018.10
Academic advisor: *Dr. Sébastien LAMBERT*

School of Astronomy & Space Science, Nanjing University — Nanjing, China
B.S. in Astronomy — 2011.09 – 2015.07
Dissertation: *Improving the Precession-Nutation model by VLBI data (in Chinese)*
Academic advisor: *Dr. Jia-Cheng LIU*

RESEARCH AND WORK EXPERIENCE

Nanjing University — Nanjing, China
Assistant Professor — 2023.09–Present
Worked in the field of astronomical reference system and high precision astrometry.

Nanjing University — Nanjing, China
"Yu-Xiu" Young Scholar Fellow (毓秀青年学者, postdoctoral fellow) — 2020.09–2023.08
Worked on the frame-ties between optical and radio reference frames as well as between dynamical and kinematic celestial reference frames.
Academic advisor: Prof. Zi ZHU and Prof. Qi WANG

GRANTS

Implication of source structure variability on the multiwavelength positions of extragalactic sources, National Natural Science Foundation of China (Youth fund, 国家自然科学基金青年项目), *PI* . . . . . 2022.01 – 2023.12

Investigation of frame-tie in the era of multiwavelength celestial reference frame, China Postdoctoral Science Foundation Fellowship (中国博士后基金面上项目), *PI* . . . . . 2021.09 – 2023.08

AWARDS

Outstanding Dissertation Award of Jiangsu Province (江苏省优秀博士论文), China 2021

"*Baogang*" Scholarship (宝钢奖学金, 400 students per year in China) 2020

"Triple-A" outstanding student of Jiangsu Province (江苏省三好学生), China 2020

PUBLICATIONS

Published

○ First-Author / Corresponding-Author

Liu N., Zhu Z., Liu J.-C., "Secular aberration drift in stellar proper motions." *Astronomy & Astrophysics Letter*, 688, L24 (2024).

Liu N., Zhu Z., Antoniadis J., Liu J.-C., et al., "Systematics of planetary ephemeris reference frames inferred from pulsar timing astrometry." *Astronomy & Astrophysics* 674, A187 (2023).

Liu N., Zhu Z., Antoniadis J., Liu J.-C., Zhang H. et al., "Comparison of dynamical and kinematic reference frames via pulsar positions from timing, *Gaia*, and interferometric astrometry." *Astronomy & Astrophysics* 670, A173 (2023).

Liu N., Lambert S., Arias F., Liu J. -C., & Zhu Z. "Evaluation of the ICRF stability from a position time series analysis." *Astronomy & Astrophysics* 659, A75 (2022).

Liu N., Lambert S., Charlot P., Zhu Z., Liu J.-C. et al. "Comparison of multifrequency positions of extragalactic sources from ICRF3 and *Gaia* EDR3." *Astronomy & Astrophysics* 652, A87 (2021).

Liu N., Lambert S., Zhu Z., & Liu J.-C. "Systematics and accuracy of VLBI astrometry: a comparison with *Gaia* Data Release 2." *Astronomy & Astrophysics* 634, A28 (2020).

Liu N., Lambert S., & Zhu Z. "Determining the accuracy of VLBI radio source catalogs." *Astronomy & Astrophysics* 620, A160 (2018).

Liu N., Zhu Z., & Liu J.-C. "Possible systematics in the VLBI catalogs as seen from *Gaia*." *Astronomy & Astrophysics* 609, A19 (2018).

Liu N., Zhu Z., Liu J.-C., & Ding C.-Y. "Overall properties of the *Gaia* DR1 reference frame." *Astronomy & Astrophysics* 599, A140 (2017).

Liu N., Liu J.-C. & Zhu Z. "Test of source selection for constructing a more stable and uniform celestial reference frame." *Monthly Notices of the Royal Astronomical Society* 466, 1567–1574 (2017).

- Collaboration

Liu J.-C., **Liu N.**, Zhu Z., Yao J., Nurul Huda I. & Wang Z.-W.. "The AllWISE Catalog as an Infrared Celestial Reference Frame in the Gaia Era." *The Astronomical Journal* 168, 4 (2024).

Yao J., Liu J.-C., **Liu N.**, Zhu Z. & Wang Z.-W.. "The Astrometric Performance of the China Space Station Telescope (CSST) Sky Survey in Extending the Gaia Celestial Reference Frame." *Research in Astronomy and Astrophysics* Volume 24, Issue 8, (2024).

Zhang J.-D., Zhang B., Xu S.-J., **Liu N.**, Chen W. et al. "VLBI astrometry of radio stars to link radio and optical celestial reference frames: observing strategies." *Monthly Notices of the Royal Astronomical Society* 529, 2062–2070 (2024).

Yao J., Liu J.-C., **Liu N.**, Malkin Z., Zhu Z. et al. "Effect of Galactic aberration on Earth orientation parameters: From the ICRF2 to the ICRF3." *Astronomy & Astrophysics* 665, A121 (2022).

Tan D.-J., Liu J.-C., Zhu Z., & **Liu N.** "Evaluating the Impact of Optical Axis Stability on Exoplanet Detection." *Research in Astronomy and Astrophysics* 22:025008 (2022).

Lambert S., **Liu N.**, Arias E. F., Barache C., Souchay J. et al. "Parsec-scale alignments of radio-optical offsets with jets in AGNs from multifrequency geodetic VLBI, *Gaia* EDR3, and the MOJAVE program." *Astronomy & Astrophysics* 651, A64 (2021).

Nural Huda I., Hidayat T., Dermawan B., Lambert S., **Liu N.** et al. "Measuring the impact of Indonesian antennas on global geodetic VLBI network." *Experimental Astronomy* 52, 141–155 (2021).

Ding C.-Y., Zhu Z., Liu J.-C., & **Liu N.** "Revisiting astrometric parameters of quasars in *Gaia*-CRF2." *Astronomy & Astrophysics* 635, A113 (2020).

Liu J.-C., & **Liu N.** "The Galactic Aberration and Its Impact on Astronomical Reference Frames." *Chinese Journal of Astronomy and Astrophysics* 44, 131–145 (2020).

Shi Y.-Y, Zhu Z., & **Liu N.**, Liu J.-C., Ding C.-Y. et al. "Comparison of PPMXL and UCAC5 catalogs with *Gaia* DR2." *The Astronomical Journal* 157, 222 (2019).

Liu J.-C., Zhu Z., & **Liu N.** "Link between the VLBI and *Gaia* Reference Frames." *The Astronomical Journal* 156, 13 (2018).

PRESENTATIONS

Invited Presentations

Rundwon Colloquium on Computational Physics, *"The Galactic aberration and its implication on the celestial reference frame."* 18 September 2024, BRIN, Indonesia.

SHAO astrophysics colloquium, *"Tie of Celestial Reference Frames in the Age of Microarcsecond Precision."* 13 October 2023, Shanghai, China.

Invited talk at Xinjiang Observatory, *"Overall properties of the planetary ephemeris frames based on pulsar timing data (基于脉冲星计时的历书参考架特性研究, in Chinese)."* 28 July 2023, Urumqi, China.

Lunch talk in South-Western Institute For Astronomy Research at Yunnan University, *"Reference Frames in the era of Gaia."* 28 September 2020, Cyberspace.

Conference Presentations

13th General Meeting of the International VLBI Service for Geodesy and Astrometry (IVS), *"Tying the extragalactic and planetary ephemeris reference frames based on pulsar astrometry."* Contributed talk, 8 March 2024, Japan.

1st FAST Scientific Forum (第一届 FAST 科学论坛), *"Systematics of the planetary ephemeris frames as seen from the pulsar timing arrays (基于脉冲星计时阵的历书参考架系统误差研究, in Chinese)."* Contributed talk, 8 September 2023, Pingtang, China.

European Astronomical Society (EAS) Annual Meeting 2023, *"Tie between extragalactic and planetary ephemeris reference frames: A perspective from the pulsar astrometry."* Contributed talk, 11 July 2023, Kraków, Poland.

7th Symposium on Current Status and Future of Fundamental Astronomy (第七届 "基本天文学现状与未来" 学术研讨会), *"Investigation of the planetary ephemeris reference frame based on pulsar timing (基于脉冲星计时的历书参考架研究, in Chinese)."* **Invited talk**, 7 July 2023, Kunming, China.

Bologna VLBI: Life begins at 40! *"Offsets between VLBI and Gaia DR3 positions of extragalactic sources: global and individual characteristics."* Poster presentation, 25 May 2023, Bologna, Italy.

5th Young Scientist Forum of Planetary Science (第五届青年行星论坛), *"Use simultaneous photometric observations to determine the stellar parallax (利用同步测光观测测定视差, in Chinese)."* Contributed talk, 27 March 2023, Sanya, China.

12th General Meeting of the International VLBI Service for Geodesy and Astrometry (IVS), *"Evaluate the ICRF3 Axes Stability via Extragalactic Source Position Time Series."* Contributed talk, 30 March 2022, Cyberspace.

Journées 2019, *"Is it possible to bring the Gaia-CRF2 into the VLBI data reduction?"* Contributed talk, 7 October 2019, Paris, France.

European Geosciences Union (EGU) 2019 General Assembly, *"From ICRF2 to ICRF3: the influence on EOP determined from VLBI observations"* poster presentation, 7 April 2019, Vienna, Austria.

TEACHING EXPERIENCE

Co-Instructor

Course: Astronomical Reference System — Spring 2022
School of Astronomy & Space Science, Nanjing University
- Assisted the main instructor to develop all course content for 20 graduate students
- Lectured for 10% of the class meetings
- Focused course on topics related to fundamentals of VLBI and space astrometry

Teaching Assistant

Course: Astronomical Reference System — Spring 2020
School of Astronomy & Space Science, Nanjing University
- Graded assignments and tests for 20 graduate students

Course: Spherical Astronomy — Spring 2016
School of Astronomy & Space Science, Nanjing University
- Graded assignments and tests for 30 undergraduate students

SYNERGISTIC ACTIVITIES

Journal Reviewer

- *Astronomy & Astrophysics*
- *Frontiers in Astronomy and Space Sciences*
- *Acta Astronomica Sinica (天文学报)*

PROFESSIONAL MEMBERSHIPS

Chinese Astronomical Society

TECHNICAL

Programming

PYTHON, C, and LaTeX

Research Software and Skills

TOPCAT/STILTS, SOFA, Calc/Solve, SGDASS

Developed Codes

FACT, vsh-tools

REFERENCES

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