

## Niu LIU (刘牛)

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### RESEARCH INTEREST

- **Reference system and frame**
- **VLBI astrometry**
- **Space 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*

### GRANTS

*Implication of source structure variability on the multiwavelength positions of extragalactic sources*, National Natural Science Foundation of China (Youth fund), *PI* . . . . . 2022.01 – 2023.12

*Investigation of frame-tie in the era of multiwavelength celestial reference frame*, China Postdoctoral Science Foundation Fellowship, *PI* . . . . . 2021.09 – 2023.08

### AWARDS

Outstanding Dissertation Award of Jiangsu Province, China . . . . . 2021

“Baogang” Scholarship (400 students per year in the whole China) . . . . .	2020
“Triple-A” outstanding student of Jiangsu Province, China . . . . .	2020
First Prize Scholarship for Ph.D. student, Nanjing University . . . . .	2018
People’s Scholarship of social practice, China . . . . .	2014

PUBLICATIONS

**Published**

○ First-Author

**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

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).

### **In Review**

**Liu N.**, Lambert S., Zhu Z., & Liu J.-C., Offsets between VLBI and *Gaia* DR3 positions of extragalactic radio sources: global and individual characteristics. [In Revision at *Astronomy & Astrophysics*].

### **In Preperation**

**Liu N.**, Zhu Z., & Liu J.-C., Astrometric properties of the *Gaia*-CRF3 solution.

## PRESENTATIONS

### **Conference Presentations**

European Astronomical Society (EAS) Annual Meeting 2023, “*Tie between extragalactic and planetary ephemeris reference frames: A perspective from the pulsar astrometry.*” Contributed talk, 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**, 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, 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, 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, May 2022, Cyberspace.

Journées 2019, “*Is it possible to bring the Gaia-CRF2 into the VLBI data reduction?*” Contributed talk, 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, May 2019, Vienna, Austria.

### Invited Presentations

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

## RESEARCH AND WORK EXPERIENCE

### Nanjing University

China

“*Yu-Xiu*” Young Scholar Fellow, Astronomy

2020.09–Present

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

## 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 L<sup>A</sup>T<sub>E</sub>X

### **Research Software and Skills**

TOPCAT/STILTS, SOFA, Calc/Solve, SGDASS

## **Developed Codes**

FACT, vsh-tools

## REFERENCES

### **Zi ZHU**

Professor, Nanjing University

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### **Sébastien LAMBERT**

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