

Shi-Jie Gao (高世杰)

Postdoctoral Researcher

Compact-object Binaries & Radio Pulsars

School of Astronomy and Space Science, Nanjing University, Nanjing, China

✉ gaosj@nju.edu.cn 📄 astro-sjgao.github.io 🌐 GitHub 🆔 0000-0002-0822-0337



Employment and Education

- 2025.07–present **Postdoctoral Researcher**, *School of Astronomy and Space Science*, Nanjing University.
Current focus: radio pulsar and transient searches.
- 2020.09–2025.06 **Ph.D., Astronomy**, *School of Astronomy and Space Science*, Nanjing University.
Advisor: Prof. Xiang-Dong Li.
Doctoral focus: formation and evolution of compact-object binaries and X-ray binaries.
- 2016.09–2020.06 **Undergraduate Studies**, *School of Physics*, Shandong University.
Major: Physics.

Research Interests and Selected Projects

- Theory **Compact-object Formation and Binary Evolution.**
Compact-object binaries, X-ray binaries, binary pulsars, and mass-gap black holes.
Modeling their formation and evolution using stellar- and binary-evolution calculations.
- Observation **Radio Pulsars and Transients.**
Pulsar searches and polarization analysis with FAST, the Green Bank Telescope, and the Parkes 64-m radio telescope (Murriyang).
Highlights include the detection of more than 30 pulsars in FAST data (the [Pulsar Gleaners](#) page lists public-data discoveries), the discovery of the first pulsar associated with Terzan 6, and studies of RRAT J2325–0530.

Publications

First-author Publications

- 2026 **Gao, Shi-Jie**, Yi-Xuan Shao, and Xiang-Dong Li. Pulsar Gleaners: Discovery of 19 Pulsars in FAST Archival Data at $|b| < 5^\circ$ and Decl. $< -5^\circ$. **ApJ**, 997, 210, [doi](#).
- 2026 **Gao, Shi-Jie**, Xiang-Dong Li, Song Wang, Kareem El-Badry, De-Jiang Zhou, Yi-Xuan Shao, Zhen Yan, Pei Wang, Ping Zhou, and Jin-Lin Han. Search for Radio Pulsations from Neutron Star Candidates in Detached Binaries. **ApJ**, 997, 222, [doi](#).
- 2025 **Gao, Shi-Jie**, Xiang-Dong Li, Zhen Yan, Yi-Xuan Shao, and Ping Zhou. RRAT J2325–0530: A Rotating Radio Transient with an Atypical Waiting-time Distribution. **ApJ**, 991, 201, [doi](#).
- 2025 **Gao, Shi-Jie**, Xiang-Dong Li, Yi-Xuan Shao, Ping Zhou, Pei Wang, Yun-Wei Yu, Zhen Yan, and Di Li. A Target Search for Fast Radio Bursts Associated with Two Fast Blue Optical Transients: AT2018cow and CSS161010. **ApJ**, 990, 93, [doi](#).
- 2024 **Gao, Shi-Jie**, Yi-Xuan Shao, Pei Wang, Ping Zhou, Xiang-Dong Li, Lei Zhang, Joseph W. Kania, Duncan R. Lorimer, and Di Li. Discovery of a Millisecond Pulsar Associated with Terzan 6. **ApJ Letters**, 974, L2, [doi](#).
- 2023 **Gao, Shi-Jie** and Xiang-Dong Li. The White Dwarf Mass–Orbital Period Relation under Wind Mass Loss. **MNRAS**, 525, 2605, [doi](#).

- 2023 **Gao, Shi-Jie** and Xiang-Dong Li. Can Cosmologically Coupled Mass Growth of Black Holes Solve the Mass Gap Problem? **ApJ**, 956, 128, [doi](#).
- 2022 **Gao, Shi-Jie**, Xiang-Dong Li, and Yong Shao. Formation of Mass-gap Black Holes from Neutron Star X-Ray Binaries with Super-Eddington Accretion. **MNRAS**, 514, 1054, [doi](#).
- 2021 **Gao, Shi-Jie** and Xiang-Dong Li. On the Magnetic Fields of Ultraluminous X-Ray Pulsars. **Research in Astronomy and Astrophysics**, 21, 196, [doi](#).

Coauthored Publications

- 2026 Yuan-Zhu Wang, Yin-Jie Li, **Gao, Shi-Jie**, Shao-Peng Tang, and Yi-Zhong Fan. A New Group of Low-spin $50\text{--}70 M_{\odot}$ Black Holes and the High Pair-instability Mass Cutoff. **Science China Physics, Mechanics & Astronomy**, 69, 299562, [doi](#).
- 2026 Yu-Dong Nie, Yong Shao, Jian-Guo He, Ze-Lin Wei, **Gao, Shi-Jie**, Xiao-Jie Xu, and Xiang-Dong Li. Formation of Recycled Pulsars in Common Envelope Binaries. **ApJ**, 997, 265, [doi](#).
- 2026 Yu-Feng Luo, Shan-Shan Weng, Qing-Zhong Liu, Ming-Yu Ge, Han-Long Peng, Shi-Qi Zhou, **Gao, Shi-Jie**, Yu-Jia Zheng, and Yan Zhang. The Orbital Parameters of Gamma-Ray Binary PSR J2032+4127. **ApJ**, 998, 332, [doi](#).
- 2026 Hong-Bo Li, **Gao, Shi-Jie**, Xiang-Dong Li, and Ren-Xin Xu. Polar Mounds on Strangeon Stars: The Neutrino Emission from Ultraluminous X-Ray Pulsars. **MNRAS**, 546, ag241, [doi](#).
- 2025 Yi-Ying Wang, **Gao, Shi-Jie**, and Yi-Zhong Fan. Probing Cosmology with 92 Localized Fast Radio Bursts and DESI BAO. **ApJ**, 981, 9, [doi](#).
- 2025 Xiangyu Ivy Wang, **Gao, Shi-Jie**, and Xiang-Dong Li. A Two-stage Kick Scenario for the Peculiar Low-mass X-Ray Binary GX 1+4. **ApJ Letters**, 991, L37, [doi](#).
- 2024 Hao-Ran Yang, Xiang-Dong Li, **Gao, Shi-Jie**, and Kun Xu. Instability in Supernova fallback Disks and Its Effect on the Formation of Ultralong Period Pulsars. **ApJ**, 976, 77, [doi](#).
- 2024 Song Wang, Xinlin Zhao, Fabo Feng, Hongwei Ge, Yong Shao, Yingzhen Cui, **Gao, Shi-Jie**, et al. A Potential Mass-gap Black Hole in a Wide Binary with a Circular Orbit. **Nature Astronomy**, 8, 1583, [doi](#).
- 2024 Yin-Jie Li, Shao-Peng Tang, **Gao, Shi-Jie**, Dao-Cheng Wu, and Yuan-Zhu Wang. Exploring Field-evolution and Dynamical-capture Coalescing Binary Black Holes in GWTC-3. **ApJ**, 977, 67, [doi](#).
- 2023 Wen-Shi Tang, **Gao, Shi-Jie**, and Xiang-Dong Li. Impact of Asymmetrical Mass Ejection from Proto-white Dwarfs on the Properties of Binary Millisecond Pulsars. **MNRAS**, 519, 2951, [doi](#).
- 2023 Jian-Guo He, Yong Shao, **Gao, Shi-Jie**, and Xiang-Dong Li. Detection Prospects of Fast-merging Gravitational Wave Sources in M31. **ApJ**, 953, 153, [doi](#).

Selected Talks and Presentations

- 2024.12.16 **Discovery of a Millisecond Pulsar Associated with Terzan 6**, *The International Pulsar Symposium 2024*, Guiyang, China.
- 2024.10.11–10.12 **Discovery of a Millisecond Pulsar Associated with Terzan 6**, *“Space-Time Probes” Pulsar Science Workshop*, Huangshan, China.
- 2023.11.23 **The White Dwarf Mass-Orbital Period Relation under Wind Mass-Loss**, *Fifth Workshop on Multi-wavelength Studies of X-ray Binaries*, Wuhan, China.
- 2023.11.10 **Formation and Evolution of Binaries with Compact Objects**, *2023 Jiangsu Graduate Student Innovation and Practice Competition in Astronomy*, Nanjing, China.
- 2023.07.10 **The Neutron Star/Black Hole Mass Gap**, *Workshop on High-Energy Radiation from Compact Objects with Insight-HXMT*, Qingdao, China.
- 2023.04.28 **Formation of Mass-Gap Black Holes from X-ray Binaries with Super-Eddington Accretion**, *The 14th Zhang Heng Symposium*, Wuhan, China.

2021.12.25 **Low-Mass-Gap Black Holes from Neutron Stars with Super-/Sub-Eddington Accretion**, *Fourth Workshop on Multi-wavelength Studies of X-ray Binaries*, Online.

Teaching, Mentoring, and Public Outreach

NJU 4.5-m Radio Telescope (NJURT)

Ongoing Commissioning and testing at Nanjing University's Zuo Dijiang Observatory, including telescope control, pointing calibration, observing-chain tests, and development of an SDR-based pulsar observing terminal for teaching and public outreach; detected radio pulsations from eight pulsars, including the Crab and Vela pulsars and PSR B0329+54. [Project webpage](#).

Student Mentoring

Current **Research Mentor**, *Can Xu and Yajing Ju, M.Sc. students*, Nanjing Normal University. Pulsar search projects.

Current **Research Mentor**, *Yihan Lu, undergraduate student*, Nanjing University. Pulsar observations with the NJU 4.5-m Radio Telescope at Zuo Dijiang Observatory.

Teaching Assistantships

2021–2025 **Teaching Assistant**, *A Brief History of the Universe (undergraduate course)*, Nanjing University, Instructor: Prof. Xiang-Dong Li. Nine semesters, from Spring 2021 through Spring 2025.

Fall 2021 **Teaching Assistant**, *Astrophysical Radiation Mechanisms (graduate course)*, Nanjing University.

Public Outreach

2026.04 **Invited Public Talk**, *From FAST to the 4.5-m Antenna: How Do We “Hear” Pulsars?*, NJU Astronomy Night VII.

2023.05.20 **Invited Public Talk**, *Stellar Evolution and Compact-Object Binaries*, School of Physics, Shandong University, Jinan, China.

2021 **Science Outreach Volunteer**, *Astronomy outreach events*, Nanjing University and Jiangsu Science and Technology Museum. Selected activities include NJU Astronomy Night II and a Science and Technology Week outreach event.

Training and Workshops

2026.05.15 **Parkes Remote Observer Training**, *Australia Telescope National Facility*, Virtual. Completed the training and became an approved remote observer for Murriyang, the Parkes radio telescope.

2024.02.06–02.08 **GBT Observer Training Workshop**, *Green Bank Observatory*, Virtual. Completed intensive Green Bank Telescope observing training and became a qualified GBT observer.

2025.08.01–08.10 **Pulsar Summer School**, *National Astronomical Observatories, Chinese Academy of Sciences*, Beijing, China.

2024.08.19–08.23 **ICESUN Summer School 2024**, *Yunnan Observatories, Chinese Academy of Sciences*, Kunming, China. Theme: *Stellar Explosions and Related Objects*. Training in stellar physics, binary evolution, massive-star evolution, common-envelope evolution, supernovae, and related observations and modeling.

2022.08.06–08.15 **Pulsar Summer School**, *National Astronomical Observatories, Chinese Academy of Sciences*, Xiamen, China.