Tianyu Tu

tty1105.github.io +86 13241574796 tianyu.tu1105@outlook.com
No.163 Xianlin Avenue, Qixia District, Nanjing, China

Education

Nanjing University, School of Astronomy and Space Science — **Nanjing, China**
PhD in Astronomy (Astrophysics) | *Supervisor*: Prof. Yang Chen — Sep. 2022 – Jun. 2027 (expected)

Laboratoire d'Astrophysique de Bordeaux — **Pessac, France**
Visiting PhD student | *co-Supervisor*: Dr. Valentine Wakelam — Dec. 2024 – Dec. 2025

Nanjing University, Kuang Yaming Honors School — **Nanjing, China**
B.S. in Astronomy — Sep. 2018 – Jun. 2022

Publications

- V.Wakelam*, **T.-Y. Tu**, *Testing various assumptions for radiolysis, non-diffusive chemistry, and chemical desorption in cold cores*. A&A (2026).
- **T.-Y. Tu***, W. Yang, S. Feng, V. Wakelam, Y. Chen*, P. Zhou, Q.-Q. Zhang, *An ACA map of a molecular cloud interacting with supernova remnant W28*. ApJ, 1006, 242 (2026).
- **T.-Y. Tu***, A. Boogert, Y. Chen*, W. He, *Dust Absorption toward Supernova Remnant W44*. AJ, 171, 323 (2026).
- **T.-Y. Tu**, V. Wakelam*, J.-C. Loison, M. Chabot, E. Dartois, Y. Chen*, *Simulation of proton radiolysis of* H_2O *and* O_2 *ices with the Nautilus code*. A&A, 708, A237 (2026).
- S.-D. Bo, Y. Huang, P. Zhou*, **T.-Y. Tu**, S. Safi-Harb*, Z.-Y. Zhang, Y. Chen, and H. Sano, *JCMT* ^{12}*CO J = 3–2 Observations of Tycho's Supernova Remnant: Constraints on the Environmental Gas Properties*. ApJ, 997, 154 (2026).
- Q.-Q. Zhang, Y. Chen*, Q.-C. Liu, X. Zhou, **T.-Y. Tu**, *A New Investigation of the Molecular Environment of Supernova Remnant G40.5−0.5*. AJ, 170, 305 (2025).
- Y-.Z. Shen, Y. Chen*, X. Zhang*, **T.-Y. Tu**, W.-J. Zhong, Q.-Q. Zhang, Q.-C. Liu, *Expanding Molecular Shell and Possible* γ*-ray Source Associated with Supernova Remnant Kesteven 67*. MNRAS, 537, 464 (2025).
- **T.-Y. Tu**, V. Wakelam, Y. Chen*, P. Zhou, Q.-Q. Zhang, *Molecular chemistry induced by J-shock toward supernova remnant W51C*. A&A, 693, A222 (2025).
- **T.-Y. Tu**, Y. Chen*, Q.-C. Liu, *Mapping the dense molecular gas towards thirteen supernova remnants*. ApJ, 978, 83 (2025).
- **T.-Y. Tu**, P. Rayalacheruvu, L. Majumdar, Y. Chen*, P. Zhou, M. Santander-García, *A Yebes W band Line Survey towards an Unshocked Molecular Cloud of Supernova Remnant 3C391: Evidence of Cosmic-Ray-Induced Chemistry*. ApJ, 974, 262 (2024).
- **T.-y. Tu**, Y. Chen*, P. Zhou, S. Safi-Harb., Q.-C. Liu, *Shock and Cosmic-Ray Chemistry Associated with the Supernova Remnant W28*. ApJ, 966, 178 (2024).

Conference contributions

Frontiers and Technology of Radio Astronomy | **Delingha, China** — Aug. 2026
Talk, *Observation of the physical and chemical feedback of supernova remnants on molecular clouds*

The 46th COSPAR Scientific Assembly 2026 | **Florence, Italy** — Aug. 2026
Talk, *Simulation of proton radiolysis of H2O and O2 ices with the Nautilus code*
Poster, *Molecular chemistry induced by a J-shock toward supernova remnant W51C*
Poster, *An ACA map of a molecular cloud interacting with supernova remnant W28*

Laboratory atomic and molecular astrophysics and molecular astrochemistry | **Tianshui, China** — Jul. 2026
Talk, *Chemical feedback of supernova remnants: dust absorption toward SNR W44*

Astrochemistry: From Quantum to Cosmos | **Nijmegen, the Netherlands** — Oct. 2025
Talk, *Simulation of proton radiolysis of H2O and O2 ices with Nautilus*

Cosmic Rays 3: The salt of the star formation recipe | **Florence, Italy** — Oct. 2024
Talk, *Chemistry induced by cosmic rays towards supernova remnants W28 and 3C391*

Supernova Remnant III: An Odyssey in Space after Stellar Death | **Chania, Greece** Jun. 2024
Poster, *A Yebes W band line survey towards Supernova remnant 3C391: Evidence of CR-induced chemistry*

Molecular Astrochemistry Workshop | **Urumchi, China** Aug. 2023
Talk, *A Yebes W band line survey towards Supernova remnant 3C391: Evidence of CR-induced chemistry*

The 10th Physics and Chemistry in the Interstellar Medium | **Shijiazhuang, China** Jul. 2023
Talk, *Shock and Cosmic Ray Chemistry in Supernova Remnant W28*

Supernova Remnant and Interstellar Medium 2023 | **Suzhou, China** Jul. 2023
Talk, *Shock and Cosmic Ray Chemistry in Supernova Remnant W28*

Approved Observing Proposals

PI, Gemini South/Flamingos2, GS-2026A-Q-334, 2.92 h 2025
Investigating the origin of the H2 emission toward supernova remnant RCW 86

PI, GBT, GBT26A-008, 39.25 h 2025
NH3 map of molecular clouds interacting with supernova remnants W28 and IC443

PI, IRAM 30m, 168-25, 19.0 h 2025
Shock and cosmic-ray chemistry induced by supernova remnant W28

PI, IRAM 30m, 135-25, 34.0 h 2025
Complex organic molecules in starless cores: a sample in the California molecular cloud

PI, ALMA, 2025.1.00086.S, 7m: 35.4 h, TP: 58.6 h 2025
Is SO+ a tracer of dissociative shock in supernova remnant IC443?

PI, CTIO-4m/NEWFIRM, 2025B-571615, 1.5 nights 2025
Probing the shock-cloud interaction toward superbubble 30 Doradus C

PI, Gemini North/GNIRS-IFU, GN-2025B-Q-143, 5.86 h 2025
Probing the farthest supernova remnant interacting with molecular cloud with H2

PI, P200/WIRC, CTAP2025-B0022, 1 night (through TAP) 2025
Is the Tycho's supernova remnant interacting with ambient molecular clouds?

PI, IRAM 30m, 006-25, 28.9 h 2025
Cosmic ray ionization towards supernova remnant HB9

PI, IRAM 30m, 016-25, 39.4 h 2025
Origin of the narrow SiO emission in IRDC G33.69-0.01

PI, NOEMA, S25AN, 19.0 h 2025
J- and C-shock chemistry towards clump C of supernova ramnant IC443

PI, NOEMA, S25AS, 15.6 h 2025
Probing the molecular cloud exposed to shock and cosmic rays from supernova remnant 3C391

PI, Yebes, 25A004, 27.2 h 2025
A Q-band line survey towards supernova remnant W28

PI, ATCA (H75 configuration), C3530 (re-submission), 5.5 h 2024
NH3 observation towards three ATLASGAL clumps associated with supernova remnant W28

PI, IRTF, 2025A003, 28.2 h 2024
Cosmic-ray processing of interstellar ice towards supernova remnant W51C

PI, IRTF, 2025A007, 14 h 2024
Probing the cosmic-ray ionization towards the Cygnus Cocoon

PI, CTIO-4m/NEWFIRM, 2025A-734415, 2 nights 2024
Probing the interaction between supernova remnants and molecular clouds towards TeV gamma-ray sources

PI, CTIO-4m/NEWFIRM, 2025A-127790, 0.5 nights 2024
Probing the shock-cloud interaction towards supernova remnant RX J1713.7-3946

PI, CFHT/WIRCAM, 25AS01, 4.54 h (through TAP) 2024
Probing the interaction between supernova remnant and molecular cloud towards Galactic PeVatron: G106.3+2.7

PI, ALMA, 2024.1.00194.S, 7m: 11.6 h, TP: 23 h 2024
Physics and chemistry of dense molecular gas interacting with SNR W28

PI, IRTF, 2024B008, 11 h 2024
Cosmic-ray processing of interstellar ice towards supernova remnant W44
PI, JCMT, M24BP015, 23.7 h, filler 2024
Estimation of cosmic-ray ionization rate towards supernova remnant Kes79
PI, Yebes, 24B010, 36.5 h 2024
Chemistry induced by cosmic rays towards supernova remnant Kes79
PI, Yebes, 24A003, 30.5 h 2024
Molecular Chemistry Induced by J-shock in Supernova Remnant W51C
PI, ATCA (H168+H75 configurations), C3530 (re-submission), 10.6 h 2023
NH3 observation towards three ATLASGAL clumps associated with supernova remnant W28
PI, GBT, GBT23B-090, 12 h 2023
Probing the cosmic-ray-ionized dense gas associated with supernova remnant HB9
PI, Yebes, 23A021, 22 h 2023
A 3mm line survey towards supernova remnant 3C391
PI, ATCA (H168 configuration), C3530, 24 h 2022
NH3 observation towards three ATLASGAL clumps associated with supernova remnant W28
PI, SMA (compact configuration), 2022B-S009, 16 h 2022
Shock and cosmic ray chemistry in molecular clouds interacting with supernova remnant W28
PI, NOEMA (D configuration), W22AS, 11 h 2022
Shock and cosmic ray chemistry in molecular clouds interacting with supernova remnant W28

co-I, PMOD, 39 h | PI: Yang Chen 2026
co-I, PMOD, 65 h | PI: Yang Chen 2024
co-I, IRAM 30m, 17.6 h | PI: Qianqian Zhang 2024
co-I, PMOD, 60 h | PI: Yang Chen 2024
co-I, PMOD, 79 h | PI: Yang Chen 2022
co-I, PMOD, 58 h | PI: Yang Chen 2022

Additional Experience

Teaching Assistant

Nanjing University, School of Astronomy and Space Science Sep. 2023 – Jan. 2024
Course for the graduate: *Radiation Mechanisms in Astrophysics*

Leadership/Teamwork Experience

Great Astronomy Fans Association of Nanjing University | *President* Jun. 2019 – Jun. 2020
Astronomy Union of Nanjing Universities | *Minister* Mar. 2019 – Mar. 2020

Honors & Awards

Daixia Scholarship (top $\sim 10\%$) | *Nanjing University* 2025
Outstanding graduate student | *Nanjing University* 2024, 2025
Academic Scholarship (Second Class, top $\sim 40\%$) | *Nanjing University* 2021
Wanglaoji Scholarship (top $\sim 10\%$) | *Nanjing University* 2020
Academic Scholarship (First Class, top $\sim 20\%$) | *Nanjing University* 2019, 2020

Skills & Interests

Languages: Mandarin Chinese (native), English (fluent)
Programming: Python, Unix Shell (basic), Fortran (basic)
Observing experience: ATCA (remote), IRTF/SpeX & iSHELL (remote), Blanco-4m/NEWFIRM (remote), IRAM 30m (on-site & remote), P200/WIRC (remote), GBT (remote)
Data reduction softwares Gildas, Miriad, CASA, Spextool, IRAF
Codes: Nautilus, Paris-Duram shock code, UCLCHEM, Meudon PDR code, PLUTO, RADEX, etc.
Academic Interests: Molecular chemistry, Supernova remnants and their feedback
Invited referee for ApJ