Chang **Liu**

TIME-DOMAIN ASTRONOMER

Department of Physics and Astronomy, Northwestern University, 2145 Sheridan Rd., Evanston, IL 60208, US

ptg.cliu@u.northwestern.edu | https://slowdiveptg.github.io | slowdivePTG

Education

PHD CANDIDATE Department of Physics and Astronomy, Northwestern University *Sep 2021 –*

- Advisor: Adam A. Miller

MASTER OF SCIENCE Department of Physics and Astronomy, Northwestern University *Sep 2021 – Jun 2023*

BACHELOR OF SCIENCE (HON) Department of Astronomy, Peking University *Sep 2016 – Jun 2020*

- Thesis: *The Hydrodynamics of Binary Mass Transfer in Compact Binaries*
- Advisors: Enrico Ramirez-Ruiz & Xian Chen

Research Interests

- Exploring the transient sky with time-domain surveys (Zwicky Transient Facility – **ZTF**; La Silla Schimidt Southern Survey – **LS4**), and merging observations with data science & numerical simulations
- **Type Ia supernovae (SNe Ia)**: constraining their ignition mechanism and progenitor systems by (i) investigating the most peculiar individual events; (ii) inferring population-level properties of normal SNe Ia in a data-driven way
- **Tidal disruption events (TDEs)**: modeling bizarre repeaters that are periodically stripped by massive black holes using hydrodynamical simulations

Publications

6 first-author papers out of **21** publications (**192** citations)

- **C. Liu**, A. A. Miller, J. S. Bloom, et al., A Morphological Model to Separate Resolved–unresolved Sources in the DESI Legacy Surveys: Application in the LS4 Alert Stream, *2025, submitted to PASP.*
- **C. Liu**, R. Yarza, & E. Ramirez-Ruiz., Repeating Partial Tidal Encounters of Sun-like Stars Leading to their Complete Disruption, *2025, ApJ, 979, 40.*
- **C. Liu**, A. A. Miller, S. J. Boos, et al., SN 2022joj: A Peculiar Type Ia Supernova Possibly Driven by an Asymmetric Helium-shell Double Detonation, *2023, ApJ, 958, 178.*
- **C. Liu**, A. A. Miller, A. Polin, et al., SN 2020jgb: A Peculiar Type Ia Supernova Triggered by a Helium-Shell Detonation in a Star-Forming Galaxy, *2023, ApJ, 946, 83.*
- **C. Liu**, B. Mockler, E. Ramirez-Ruiz, et al., Tidal Disruption Events from Eccentric Orbits and Lessons Learned from the Noteworthy ASASSN-14ko, *2023, ApJ, 944, 184.*
- **C. Liu**, X. Chen, & F. Du, Impact of an Active Sgr A* on the Synthesis of Water and Organic Molecules Throughout the Milky Way, *2020, ApJ, 899, 2.*
- L. A. Kwok et al. (including **C. Liu**), JWST and Ground-based Observations of the Type Iax Supernovae SN 2024pxl and SN 2024vjm: Evidence for Weak Deflagration Explosions, *2025, submitted to ApJ.*
- M. Singh et al. (including **C. Liu**), Photometry and Spectroscopy of SN 2024pxl: A Luminosity Link Among Type Iax Supernovae, *2025, submitted to ApJ.*
- K. K. Das et al. (including **C. Liu**), Low-Luminosity Type IIP Supernovae from the Zwicky Transient Facility Census of the Local Universe. I: Luminosity Function, Volumetric Rate, *2025, PASP, 137, 044203.*
- A. A. Miller et al. (including **C. Liu**), The La Silla Schmidt Southern Survey, *2025, to be submitted to PASP.*

- L. Harvey et al. (including **C. Liu**), ZTF SN Ia DR2: High-velocity components in the Si IIλ6355, *2025, A&A, 695, A264.*
- Y. Yao et al. (including **C. Liu**), A Massive Black Hole 0.8 kpc from the Host Nucleus Revealed by the Offset Tidal Disruption Event AT2024tvd, *2025, ApJL accepted.*
- A. Y. Q. Ho et al. (including **C. Liu**), A Luminous Red Optical Flare and Hard X-ray Emission in the Tidal Disruption Event AT2024kmq, *2025, ApJ accepted.*
- T. Eftekhari et al. (including **C. Liu**), The Massive and Quiescent Elliptical Host Galaxy of the Repeating Fast Radio Burst FRB 20240209A, *2025, ApJL, 979, L22.*
- N. Rehemtulla et al. (including **C. Liu**), The BTSbot-nearby discovery of SN 2024jlf: rapid, autonomous follow-up probes interaction in an 18.5 Mpc Type IIP supernova, *2025, ApJ accepted.*
- G. Dimitriadis et al. (including **C. Liu**), ZTF SN Ia DR2: The diversity and relative rates of the thermonuclear supernova population, *2024, A&A, 694, A10.*
- Z. Wu et al. (including **C. Liu**), Gaia22dkvLb: A Microlensing Planet Potentially Accessible to Radial-Velocity Characterization, *2024, AJ, 168, 62.*
- K. Das et al. (including **C. Liu**), SN 2023zaw: an ultra-stripped, nickel-poor supernova from a low-mass progenitor, *2024, ApJL, 969, L11.*
- P. Chen et al. (including **C. Liu**), A 12.4 Day Periodicity in a Close Binary System after a Supernova, *2023, Nature, 625, 7994, 253-258.*
- G. Dimitriadis et al. (including **C. Liu**), SN 2021zny: an early flux excess combined with late-time oxygen emission suggests a double white dwarf merger event, *2023, MNRAS, 521, 1162.*

Telescope Experience

Observing Runs Keck I (LRIS) ‖ 7 n, Keck II (DEIMOS) ‖ 1 n, Magellan (FIRE) ‖ 2 n *2023 – 2025*

PI 10 m Keck Telescopes, Northwestern ‖ 1.5 n *2025B*

PI 6.5 m Magellan Baade Telescope, Northwestern ‖ 1 n *2025B*

PI 6.5 m Magellan Baade Telescope, Northwestern ‖ 1 n *2025A*

PI 2.56 m Nordic Optical Telescope (NOT), NOIRLab ‖ 6 hr *2025A*

PI 4.1 m Southern Astrophysical Research (SOAR) Telescope, NOIRLab ‖ 10 hr *2025A*

PI 10 m Keck Telescopes, Northwestern ‖ 2 n *2024B*

Talks & Posters

Poster Transients from Space *Mar 2025*

Talk LS4 Team Meeting *Mar 2025*

Poster Rise_Time 2024 *Aug 2024*

Talk 243rd AAS meeting *Jan 2024*

Talk The 32nd Texas Symposium on Relativistic Astrophysics *Dec 2023*

Talk Tsinghua University *Dec 2023*

Seminar Peking University *Dec 2023*

Talk ZTF 5th Science Meeting *Oct 2023*

Poster Keck Science Meeting *Sep 2023*

Seminar Tsung-Dao Lee Institute, Shanghai Jiao Tong University *Jun 2023*

Talk SPOKEN-WERRD 2022 Symposium *Nov 2022*

Talk ZTF 3rd Science Meeting *Oct 2022*

Talk PKU-DoA Undergraduate Astronomy Symposium *Sep 2020*

Skills

Languages Chinese, English

Programming **Proficient:** Python **Experienced:** Shell, Fortran, C/C++, SQL

Softwares
- HostSub_GP (**developer**): removing host galaxy contimination in transient spectroscopy
- BayeSpecFit (**developer**): fitting supernova spectroscopic features in a Bayesian way
- Pypeit: optical/NIR spectrum reduction
- Photoshop & Lightroom: as a shutterbug

Advising and Teaching

CIERA Scientist Mentor REACH Further (Indepdent Reseach Experience for REACH Students) *Aug 2023*
- Mentee: Isabella Chen

Teaching Assistant PHYSICS 333-2 (Advanced Electricity & Magnetism) *Sep 2022 – Dec 2022*

Teaching Assistant PHYSICS 130-2 (College Physics) *Jan 2023 – Mar 2023*

Teaching Assistant ASTRON 103-0-1 (Solar System) *Mar 2023 – Jun 2023*

Professional Service

Referee Astrophysical Journal

Referee Astrophysical Journal Letters

Outreach

Presenter *Evanston, US*

Research Experience in Astronomy at CIERA for High School Students (REACH) *Jul 2023*

Invited Speaker (*supernovae: from the past to the future*) *Beijing, China*

Peking University Youth Astronomy Society (PKU-YAS) *Apr 2021*

Volunteer *Beijing, China*

Summer Camp of Astronomy for High School Students, Peking University *Jul 2018*

References

Prof. Adam A. Miller *Evanston, US*

amiller@northwestern.edu *Department of Physics and Astronomy, Northwestern University*

Prof. Enrico Ramirez-Ruiz *Santa Cruz, US*

enrico@ucolick.org *Department of Astronomy and Astrophysics, UC Santa Cruz*

Prof. Xian Chen *Beijing, China*

xian.chen@pku.edu.cn *Department of Astronomy, Peking University*