

Chang Liu

TIME-DOMAIN ASTRONOMER

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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 Schmidt 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 22 publications

- **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.
- A. C. Gordon et al. (including **C. Liu**), Mapping the Spatial Distribution of Fast Radio Bursts within their Host Galaxies, 2025, *submitted to ApJ*.
- 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*, 985, L48.
- 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*, 985, 241.
- 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*.
- J. C. Rastinejad et al. (including **C. Liu**), EP 250108a/SN 2025kg: Observations of the most nearby Broad-Line Type Ic Supernova following an Einstein Probe Fast X-ray Transient, 2025, *submitted to ApJL*.
- 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 II λ 6355, 2025, *A&A*, 695, A264.
- 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.
- 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

Seminar	Berkeley/DESI	Jun 2025
Poster	Center for Decoding the Universe Annual Conference	Jun 2025
Seminar	University of California, Santa Cruz	Jun 2025
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
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
Talk PKU-DoA Undergraduate Astronomy Symposium

Oct 2022

Sep 2020

Skills

Languages Chinese, English

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

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

Softwares

Advising and Teaching

Ciera Scientist Mentor REACH Further (Independent Research 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

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Prof. Enrico Ramirez-Ruiz

Santa Cruz, US

✉ ENRICO@UCOLICK.ORG

Department of Astronomy and Astrophysics, UC Santa Cruz

Prof. Xian Chen

Beijing, China

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Department of Astronomy, Peking University