YI-XIAN CHEN (陈逸贤)

Email: yc9993@princeton.edu | Website: yi-xian-chen.github.io | Tel: 6093757519

EDUCATION

Department of Astrophysical Sciences, Princeton University **Princeton**
PhD in Astrophysical Sciences; Advisor: Jeremy Goodman Sep 2021 – Expected June 2026

- **Research Interests:**
  Planetary astrophysics: Planet formation and migration in protoplanetary disks; Observable signatures of planet-disk interactions; Dust evolution in protoplanetary disks; Planet atmospheres and spectra
  AGN Disks: Gravitational Instability and MRI in accretion disks; Formation and evolution of Stars and Black Holes in AGN Disks; Tidally distorted and warped accretion disks; Extreme (eccentric, inclined) orbiters
- **Awards & Honors:**
  Princeton First Year Fellowship in Natural Science & Engineering, 2021 ($90k*)*
  Citadel GQS PhD Fellowship, 2024 ($100k, *only recipient among all physics PhD in the US)*

Department of Physics, Tsinghua University **Beijing**
Bachelor in Physics; Advisor: Douglas N. C. Lin Sep 2017 - Jun 2021

- **Awards & Honors:**
  Chi-Sun Yeh Scholarship (Highest Honor for Physics Major), 2021
  Tsinghua University Prestigious (特等) Scholarship (Highest Honor for Undergraduates, 10 per year), 2020
  Lin-bridge Scholarship (Awarded for Excellent Astrophysical Research), 2020
  Nan-Xiang Jiang Scholarship (Highest Honor for Juniors), 2019
  Dec. 9th Scholarship (Highest Honor for Sophomores), 2018
- **Programs:**
  Member of Tsinghua University Spark project, research scholar cultivation program

University of California, Berkeley **Berkeley**
Exchange Program Aug 2019 - Dec 2019

LEADING-AUTHOR PUBLICATIONS

1. **Chen Y.X.***, Li Y.P., Li H., Lin D.N.C., *The Preservation of Super Earths and the Emergence of Gas Giants after Their Progenitor Cores Have Entered the Pebble Isolation Phase*, ApJ, 896, 135
2. **Chen Y.X.*,** Zhang X., Li Y.P., Li H., Lin D.N.C., *Retention of Long-Period Gas Giant Planets: Type II Migration Revisited*, ApJ, 900, 44
3. Li Y.P.*, **Chen Y.X.*,** Lin D.N.C., Zhang X., *Accretion of Gas Giants Constrained by the Tidal Barrier*, ApJ, 906, 52
4. **Chen Y.X.*,** Wang Z., Li Y.P., Baruteau C., Lin D.N.C., *Wide Dust Gaps in Protoplanetary Disks Induced by Eccentric Planets: A Mass-Eccentricity Degeneracy*, ApJ, 922, 184
5. Li R.*, **Chen Y.X.**, Lin D.N.C., *Dust Accumulation near the Magnetosphere Truncation of Protoplanetary Discs around T Tauri Stars*, MNRAS, 510, 5246
6. Li Y.P.*, **Chen Y.X.*,** Lin D.N.C., Wang Z., *Spin Evolution of Stellar-mass Black Holes Embedded in AGN disks: Orbital Eccentricity Produces Retrograde Circumstellar Flows*, ApJL, 928, 1

7. Zhou T., Deng H., **Chen Y.X.***, Lin D.N.C., *Turbulent Transport of Dust Particles in Protoplanetary Disks: The Effect of Upstream Diffusion*, ApJ, 940, 117

8. **Chen Y.X.***, Bailey A., Stone J., Zhu Z., *Prograde and Retrograde Gas Flow around Disk-embedded Companions: Dependence on Eccentricity, Mass and Disk Properties*, ApJL, 939, 23

9. **Chen Y.X.***, Jiang Y.F., Goodman J., Ostriker E., *3D Radiational Hydrodynamics Simulations of Gravitational Instability in AGN Disks: The Effects of Radiation Pressure*, ApJ, 948, 120

10. **Chen Y.X.***, Lin D.N.C., *Chaotic Gas Accretion by Black Holes Embedded in AGN Disks as Cause of Low-spin Signatures in Gravitational Wave Events*, MNRAS, 522, 319

11. Wu Y.†*, **Chen Y.X.†***, Jiang H.†*, et al., *Distinguishing Magnetized Disc Winds from Turbulent Viscosity through Substructure Morphology in Planet-forming Discs*, MNRAS, 523, 2630

12. **Chen Y.X.***, Burrows A., Sur A., Arevalo R.T., *Jupiter Atmospheric Models and Outer Boundary Conditions for Giant Planet Evolutionary Calculations*, ApJ, 957, 36

13. Li Y.P.*, **Chen Y.X.,** Lin D.N.C., *3D Global Simulations of Accretion onto Gap-opening Planets: Implications for Circumplanetary Disc Structures and Accretion Rates*, MNRAS , 526, 5346

14. Wu Y.*, **Chen Y.X.***, Lin D.N.C., *Chaotic Type I Migration in Turbulent Discs,* MNRAS Letters, 528, 127

15. Li R.*, **Chen Y.X.**, Lin D.N.C., *Dust Accumulation near the Magnetosphere Truncation of Protoplanetary Discs around T Tauri Stars II. The Effects of Opacity and Thermal Evolution*, MNRAS, 529, 893

16. **Chen Y.X.***, Lin D.N.C., *The Population of Massive Stars in AGN Disks*, ApJ, 967, 88

17. Li Y.P.*, **Chen Y.X.,** Lin D.N.C., *Concurrent Accretion and Migration of Giant Planets in their Natal Disks with Consistent Accretion Torque*, ApJ, 971, 130

18. **Chen Y.X.***, Jiang Y.F., Goodman J., Lin D.N.C., *Radiation Hydrodynamic Simulations of Massive Stars in Gas-rich Environments: Accretion of AGN Stars Suppressed By Thermal Feedback*, accepted by ApJ

* indicates corresponding author, † indicates equal contribution

See list of publication on arXiv

Academic References

- Professor Douglas N. C. Lin, UC Santa Cruz & Tsinghua University
- Professor Jeremy Goodman, Princeton
- Professor Eve C. Ostriker, Princeton
- Professor Adam Burrows, Princeton
- Professor James Stone, Institute for Advanced Study
- Dr Yan-Fei Jiang, Flatiron Institute

Selected Scientific Talks

- **Stellar Object Formation and Evolution in AGN Disks** **Shanghai & Beijing**
  Seminar Talk, Invited by Tsinghua University, Shanghai Observatory, TD Lee Institute etc. May-June 2023

- **Enhancement of Star Formation in AGN Disks by Radiation Pressure** **New York City**

Oral Presentation, 2nd Athena++ Workshop (Jimfest) May 2023

- **3D RHD Simulations of Gravitational Instability in AGN Disks** **Pasadena, California**
  Oral Presentation, AAS 240 Jun 2022
- **Understanding Migration of Gas Giants** **Las Vegas, Nevada**
  Oral Presentation, Exoplanet IV Apr 2022
- **Accretion of Gas Giants Constrained by the Tidal Barrier** **Tucson, Arizona (Virtual)**
  Online Talk, invited by UArizona Planet Group Dec 2020
- **The Lense-Thirring Precession and Warped Accretion Disks** **Beijing**
  Final project for Advanced General Relativity Dec 2020
- **The Preservation of Hot Super Earths and Cold Gas Giants** **Tucson, Arizona (Virtual)**
  Online Talk, invited by UArizona Planet Group Jun 2020
- **Introduction to Planetary Astrophysics** **Beijing**
  Chi-sun Yeh Academic Lectures, Tsinghua University Jun 2020
- **Formation of Close-in Planets (sub-Neptunes/super-Earths)** **Beijing**
  Department of Astronomy (DoA) seminar on theoretical astrophysics, Tsinghua University Apr 2020
- **Galactic Center Microlensing** **Berkeley, California**
  Report of research project, Moving Universe Group Meeting Dec 2019
- **Dust Diffusion in Protoplanetary Disks and Formation of super Earths** **Urumqi**
  Report of research project, Formation and Evolution of Planetary System Conference Jul 2019
- **Linear Magneto-Rotational Instability** **Beijing**
  DoA seminar on theoretical astrophysics, Tsinghua University Apr 2019

CONFERENCES & WORKSHOPS

- **Frontiers of Astrophysics Forum, Shanghai** July 2024
- **Accretion Modified Stars in AGNs, Nanjing** June 2023
- **Center of Computational Astrophysics Athena++ Workshop, New York** May 2023
- **Where are the Objects in AGN Disks? Santa Fe** March 2023
- **AAS 240 Meeting, Pasadena** June 2022
- **Exoplanet IV, Las Vegas** May 2022
- **IMPRS Summer School on "Planet Formation in Protoplanetary Disks", Heidelberg (Virtual)** August 2020
- **Exoplanets III, Heidelberg (Virtual)** July 2020
- **Sagan Workshop on Extreme Precision Radial Velocity, Pasadena, California (Virtual)** July 2020
- **Formation and Evolution of Planetary System Seminar, Urumqi, Xinjiang** July 2019
- **Astrophysical Dynamics Conference, Shanghai** July 2019

PROFESSIONAL SERVICES

Referee: MNRAS, Icarus

Outreach: Guest Lecturer for Winchester College Astronomy Day (2024), Organizer of Princeton Astrophysics Thursday Lunch Talk (2022)

Teaching: *The Universe* (Assistant Instructor, 2023 Spring, Princeton undergraduate course)

STUDENTS ADVISED

- **Max Qiu (Grade 12)** Nov 2022 - May 2023
  ISEF (International Science and Engineering Fair) Project: *Enhanced Microlensing in the Galactic Center*
- **Jeff Ho (Grade 12)** May 2023 - Aug 2023
  S. T. Yau High School Science Fair Project: *Structure of AGN Disks Across A Wide Range of Parameter Space*

SKILLS AND INTERESTS

Language Abilities:

- Chinese: Mandarin (native), Cantonese
- Japanese (N2)
- English: fluent oral speaker, representing China in international speech contests
- **Awards & Honors:**
  China Daily English Speaking Competition (College Group) National Championship, 2019
  English Speaking Union International Public Speech Contest (IPSC) Finalist/Third Place, 2019
  China Daily English Speaking Competition (High School Group) National Championship, 2017
- Featured in official English Promotion Video for Tsinghua University: *Beyond the Pages*

Programming Languages: Mathematica, Matlab, python, C++, HTML, LaTeX

Professional Software: FARGO3D, RADMC-3D, Athena++, CoolTLusty, MESA

Music and Vocal performance:

- Former Member of Tsinghua University chorus and Berkeley Chinese Acappella, performed in various concerts and competitions
- Selected Vocal Performances: *My Way*, *Wandering Earth Theme*, *Keep me by your Side (让我留在你身边)* , *When we were Young*, *葡萄成熟時*, *This is the Moment*, *Shall We Talk*, *任我行*, *昴- すばる*

Film production:

- Wrote screenplays for and produced short play *Ode to Guitar (2018)* and sci-fi film *A Wicked Letter Through Time (2019)*