Zirui Chen

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Education & Professional Experience

Columbia University, NY, USA
B.A. in Physics and Astronomy (GPA 4.06/4.3) September 2018–May 2022
Advisors: Greg Bryan, Drummond Fielding, David Kipping

Center for Computational Astrophysics, Flatiron Institute, NY, USA
Guest Researcher May 2022–August 2022

University of California, Santa Barbara, CA, USA
M.A. and Ph.D. in Astrophysics September 2022–Present
Advisor: S. Peng Oh

Awards & Honors

- James and Mary Jo Hartle Graduate Fellowship (UCSB) September 2022
- Summa Cum Laude (Columbia) May 2022
- Departmental Honor, Physics (Columbia) May 2022
- The Phi Beta Kappa Society (Columbia) December 2021
- John Jay Scholar (Columbia) September 2018–May 2022
- Dean's List (Columbia) September 2018–May 2022

Research Interests

- Turbulence in Galaxies; Galaxy Evolution; Circumgalactic Medium and Galactic Winds; Dynamics of Multiphase Gas; Astrophysical Atomic & Molecular Processes; Computational Astrophysics.

Publications

1. **Zirui Chen** and S. Peng Oh, "The Survival and Entrainment of Molecules and Dust in Galactic Winds", 2024, Monthly Notices of the Royal Astronomical Society, 530, 4032.
2. **Zirui Chen**, Drummond Fielding, and Greg Bryan, "The Anatomy of a Turbulent Radiative Mixing Layer: Insights from an Analytic Model with Turbulent Conduction and Viscosity", 2023, The Astrophysical Journal, 950, 91.
3. Zixuan Peng, Crystal Martin, **Zirui Chen**, Drummond B. Fielding, et al., "Physical Origins of Outflowing Cold Clouds in Local Star-Forming Dwarf Galaxies", 2025, The Astrophysical Journal, 981, 171.
4. **Zirui Chen** and David Kipping, "The Number of Transits Per Epoch for Transiting Misaligned Circumbinary Planets", 2022, Monthly Notices of the Royal Astronomical Society, 513, 5162.

Grants & Proposals

- Hubble Space Telescope Cycle 32 Archival Research Proposal, ID 17860, **Co-PI** October 2024

  "Interface: A New Tool for Generating Absorption and Emission Spectra from Multi-Phase Mixing Layers" . Received funding for a senior graduate student for 6 months **($50,000.00)**.

- Non-thermal Processes at Multiphase Boundaries in the Interstellar and Circum-galactic Medium, ACCESS PHY240194, **Co-PI** October 2024

  107.6k node hours and **200kGB archival storage** on the Stampede3 computing cluster at UT Austin. The estimated value of these awarded resources is **$63,800.00**.

- Turbulence and Thermally Unstable Gas, ACCESS PHY240001, **PI** January 2024

  400k ACCESS credits on 40+ NSF supported computing clusters in the US.

- Molecular Cloud in Galactic Winds, ACCESS PHY230107, **PI** July 2023

  400k ACCESS credits on 40+ NSF supported computing clusters in the US.

Talks

- Astronomy on Tap, Santa Barbara (Astronomy Talk at a Bar) February 2025
- GalFRESCA, Carnegie Observatories (Southern California Galaxy Formation & Evolution Meeting) September 2024
- UCSB Astro Lunch November 2023
- Center for Computational Astrophysics Galaxy Formation Group Meeting November 2023
- Center for Computational Astrophysics & Tel Aviv University Galaxy Formation Workshop June 2022
- Columbia University AstroFest (Poster Presentation) September 2021

Student Advising

- Youxing Xu, 3rd Year Undergraduate Student, UCSB January 2024–June 2024

  Advised undergraduate student Youxing on testing the convergence of cold gas column density in cosmological simulations.

Teaching & Outreach

- Teaching Assistant, UCSB September 2022–June 2024

  Astro 1 (introductory astronomy course); Physics 4L, 6AL, and 6BL (introductory experimental physics course).

- Volunteer, Columbia Astronomy Outreach Program September 2018–May 2022

  Organized and publicized bimonthly lecture series and stargazing events for Columbia and the public.

Skills

- Programming & Scientific Computing

  Programming languages: Python, Java, and C++.

  Proficient at running hydrodynamic simulations using Athena++ and at cluster computing. Have experience in processing and fitting raw light curve data, simulating N-body dynamics, and building numerical models for planetary and stellar structures.

- Languages

  Fluent in Mandarin and English.

  Standardized Testing: TOEFL 118/120; ACT 35/36; GRE 337/340.