

ZIXUAN PENG

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RESEARCH INTERESTS

- Supernova-driven galactic winds • Superbubble breakthroughs and blowouts • Galaxy mergers and Lyman continuum photon escape • Chemical evolution of star-forming galaxies • Integrating observational data with analytical models and numerical simulations

EDUCATION

Doctor of Philosophy, Physics, UC Santa Barbara

Sept. 2021 - Present

Emphasis: Astrophysics

Committee: Dr. Crystal L. Martin, Dr. Joseph F. Hennawi, Dr. S. Peng Oh

Bachelor of Science, Physics, UC Santa Barbara

Sept. 2017 - June 2021

Minor: Astronomy And Planetary Science

Bachelor Honors Thesis: Extreme Emission-Line Galaxies: Electron Temperature, Electron Density, and Metallicity (Advisor: Dr. Crystal L. Martin)

PUBLICATIONS

■ First or Second Author:

1. **Peng Z.**, Martin, C., Chen, Z., et al. (submitted to *The Astrophysical Journal*), “Physical Origins of Outflowing Cold Clouds in Local Star-forming Galaxies” <https://arxiv.org/abs/2412.05371>
2. Martin, C., **Peng Z.**, & Li, Y. (2024, *The Astrophysical Journal*), “Resolving the Mechanical and Radiative Feedback in J1044+0353 with KCWI Spectral Mapping” <https://arxiv.org/abs/2403.11390>
3. **Peng Z.**, Martin, C., Thibodeaux, et al. (2023, *The Astrophysical Journal*), “Using KCWI to Explore the Chemical Inhomogeneities and Evolution of J1044+0353” <https://arxiv.org/abs/2308.00351>

■ Co-Author:

1. Moya-Sierralta, C., Martin, C., Barrientos, L., et al. (**Peng Z.** included) (submitted to *Astronomy & Astrophysics*), “Galaxy Protoclusters as Drivers of Cosmic Reionization: II. T_e -Based Metallicities of Lyman- α Emitters”
2. Hu, W., Papovich, C., Shen, L., et al. (**Peng Z.** included) (submitted to *Nature*), “JWST’s Quintet at Redshift 6.7: Early Growth of a Massive Galaxy and Enrichment of the Circum-Galactic Medium”

SELECTED FELLOWSHIPS AND AWARDS

- Worster Summer Research Fellowship (Role: Mentor; Mentee: Jiayang Yang) June 2024 - Sept. 2024
- [Future Investigators in NASA Earth and Space Science and Technology Award](#) Oct. 2023 - Oct. 2026
- Worster Summer Research Fellowship (Role: Mentor; Mentee: Yuan Li) June 2022 - Sept. 2022
- UCSB Physics Academic High Honors Award June 2021
- UCSB Physics Research Honors Award June 2021

OBSERVING EXPERIENCE

■ Keck Telescopes (Co-I; PI: C. L. Martin)

- Keck/KCRM (2.5 nights): Building Physical Diagnostics of Galaxy Outflows II Sept. 2023 – May 2024
- Keck/ESI (3.5 nights): Building Physical Diagnostics of Galaxy Outflows I Nov. 2022 – Apr. 2023
- Keck/KCWI (1 night): Ionization Structure of Low-Mass, High-Ionization Galaxies Dec. 2021

TEACHING & MENTORING EXPERIENCES

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| ■ Teaching Assistant (Physics Department at UC Santa Barbara) | Oct. 2021 - June 2022 |
| • PHYS 133 (Galaxies and Cosmology) | Mar. 2022 - June 2022 |
| • PHYS 131 (Stellar Structure and Evolution) | Jan. 2022 - Mar. 2022 |
| • PHYS 3L (Physics Laboratory) | Oct. 2021 - Jan. 2022 |
| ■ Learning Assistant (Physics Department at UC Santa Barbara) | Apr. 2019 - Dec. 2020 |
| • PHYS 115A (Quantum Mechanics A) | Aug. 2020 - Dec. 2020 |
| • PHYS 115B (Quantum Mechanics B) | Apr. 2020 - June 2020 |
| • PHYS 104 (Advanced Mechanics) | Apr. 2019 - June 2019 |
| ■ Mentored Students: | |
| 1. Jiayang (Annabella) Yang (UCSB Undergraduate) | April 2024 - Present |
| 2. Kaitlyn Casciotti (Embry-Riddle Undergraduate) | July 2024 - Sept. 2024 |
| 3. Yuan Li (UCSB Undergraduate; TAMU PhD) | June 2022 - Present |
| 4. Katherine Kudla (Providence College Undergraduate; UCSB PhD) | July 2023 - Sept. 2023 |
| 5. Jichen Zhang (UCSB Undergraduate; CUHK PhD) | June 2022 - June 2023 |
| 6. Ilia Qato (UIUC Undergraduate) | July 2022 - Sept. 2022 |

TALKS AND POSTERS

- Talk: “[Physical Origins of Outflowing Cold Clouds in Local Star-forming Galaxies](#),” 2024 Cosmic Dawn Revealed by JWST: The Physics of the First Stars, Galaxies, and Black Holes, Kavli Institute for Theoretical Physics, UC Santa Barbara
- Talk: “Using KCWI to Explore the Chemical Evolution and Feedback in a Reionization-era Spectral Analog J1044+0353,” 2023 ELT Science in Light of JWST, UCLA Faculty Center, UC Los Angeles
- Talk: “Using KCWI to Explore Spatial Variations in Metallicity in an Extreme Emission-Line Dwarf Galaxy,” Fall 2022 Astro Lunch, Physics Department, UC Santa Barbara
- Poster: “J1044+0353: Using KCWI to Explore Spatial Variations in Metallicity,” 2022 Keck Science Meeting, Cahill Center for Astronomy and Astrophysics, California Institute of Technology

TECHNICAL SKILLS

Programming Languages: Python, Matlab, Mathematica, C++, Linux/Unix

Astrophysics Packages/Softwares: [BEAGLE](#), [Cloudy](#), [IRAF](#), [MESA](#), [SAOImageDS9](#), [STARBURST99](#)

SOFTWARE

- [VerEmisFitting](#): A Python-based, user-friendly, and flexible emission-line fitting package.

SELECTED COURSEWORKS

Graduate Classes:

PHYS 215ABC - Quantum Mechanics

PHYS 231AB - General Relativity

PHYS 232 - Stellar Structure and Evolution

PHYS 234 - High Energy Astrophysics

PHYS 236 - Cosmology

PHYS 219 - Statistical Mechanics

PHYS 240 - Statistics Data Analysis and Machine Learning

PHYS 233 - Interstellar Medium

PHYS 235 - Extragalactic Astrophysics

PHYS 237 - Galactic Dynamics