HONGFEI YU

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Research Interests: Large-scale Structure, Dark Energy, Dark Matter

EDUCATION

University of Science and Technology of China, China Sep. 2023 - Jun. 2027 (Expected)
Wang Shouguan Talent Program in Astronomy, Department of Astronomy, School of Physical Science

- **Overall GPA:** 3.45/4.30 (84.6/100) **Ranking:** 9/26
- **Graduate-level**: General Relativity, Modern Cosmology, Large Scale Structure
- **GRE Physics:** 930 (84%, Oct. 26, 2025)

RESEARCH EXPERIENCE

Research on Frontier Topics in Modern Cosmology Aug. 2024 - Jul. 2025
National Astronomical Observatories, Chinese Academy of Sciences | Advisor: Prof. Hongming Zhu *Remote*

- Reproduced N-body simulation and power spectrum estimator in Python; verified results using Quijote simulations (NGP/CIC).
- Developed a GitHub repository for reproducible code and analysis.

Research on Galaxy-Halo Clustering within Cosmic Void using Constrained Simulation Aug. 2025 - present
University of Science and Technology of China | Advisor: Prof. Huiyuan Wang *Hefei, China*

- **Project Overview:** Investigating the significant discrepancy where observed dwarf galaxy clustering around cosmic voids exceeds theoretical predictions. Utilizing ELUCID constrained simulations to construct halo catalogs that strictly match the SDSS DR7 observational volume for direct comparison.
- **Statistical Analysis:** Calculated the Galaxy-Void Two-Point Cross-Correlation Function (2PCCF) to quantify the clustering signal ; Used SHMR to populate halos with galaxies and compared the their 2PCCF.
- **Mechanism Study:** Exploring the physical origins of the signal by analyzing secondary dependencies (e.g., color, Sérsic index) ; testing the impact of Halo Assembly Bias in low-density environments to refine the galaxy-halo connection model.

Research on Dark Energy Models Dec. 2025 - present
University of Science and Technology of China | Advisor: Prof. Wenjuan Fang *Hefei, China*

- **Member of the DESI Collaboration**: Observational constraint in dynamical dark energy clustering.
- Recently reading 0307104 and 0307100 to understand the perturbation theory of dark energy models.

TA EXPERIENCE

Theoretical Mechanics A Sep. 2025 - Jan. 2026
University of Science and Technology of China | Instructor: Prof. Jiejie Zhu *Chinese Class*

- **Responsibilities:** Assisted in tutorials and office hours; graded assignments and exams.

AWARDS AND HONORS

- Excellent Freshman Scholarship - Gold (2023), Excellent Student Scholarship - Bronze (2024, 2025)

SKILLS

Programming: Python, C
Tools: NumPy, SciPy, Matplotlib, Git, LaTeX, Shell