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:** 3.51/4.30 (85.56/100) **Ranking:** 9/26
- **Graduate-level**: General Relativity, Modern Cosmology (97), Large Scale Structure (98), AI and Probability in Astrophysics
- **TOEFL:** 5.0 (s5.0) **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 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. Reproducing the process using TNG300-1 simulations to validate findings.

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

- **Member of the DESI Collaboration**: Group of Cosmological Parameters Constraint (CPE).
- **Project Overview:** Investigating the clustering properties of dynamical dark energy models especially the CPL parameterization characterized by a time-varying equation of state (EoS) parameterized as $w(a) = w_0 + w_a(1-a)$. Focusing on how to constrain the effective sound speed c_s^2 of dark energy using current and future large-scale structure observations, including galaxy distribution, CMB, BAO and etc..

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.

Electrodynamics A Mar. 2026 - Jun. 2026
University of Science and Technology of China | Instructor: Prof. Wandong Liu *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, Cobaya, CLASS, Git, LaTeX, Shell