Zhenyang Huang

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ORCID | Github | Homepage

University of Chinese Academy of Sciences, Xinjiang Astronomical Observatory

Research Interests

My research centers on data-driven astronomy and astrophysics, with an emphasis on interpretable/physics-guided machine learning. I aim to uncover and validate underlying physical mechanisms directly from large datasets and to formulate hypotheses.

Education

- **University of Chinese Academy of Sciences** *Aug.2023 - Jun.2026*
  M.S. in Astronomy Xinjiang Astronomical Observatory
  - Major Courses: Advanced Astronomy, Deep Learning, Optimization Methods in Data Analysis, Big Data Analytics
- **Sun Yat-sen University** *Aug.2016 - Jun.2020*
  B.S. in Physics School of Physics and Astronomy
  - Major Courses: Advanced Mathematics, Linear Algebra, Electrodynamics, Quantum Mechanics, Thermodynamics and Statistical Physics, Mathematical Methods for Physics

Publications & Manuscripts

∗ = Co–first author

[1] **Zhenyang Huang**, Haihao Shi, Zhiyong Liu, Na Wang. (2025). **An Interpretable AI Framework to Disentangle Self-Interacting and Cold Dark Matter in Galaxy Clusters: The CKAN Approach**. *Under review at The Astronomical Journal (AJ)*.

[2] Haihao Shi*, **Zhenyang Huang***, Qiyu Yan, Junda Zhou, Guoliang Lü, Xuefei Chen. (2025). **Application of interpretable data-driven methods for the reconstruction of supernova neutrino energy spectra following fast neutrino flavor conversions**. *arXiv:2507.09632* (preprint). *Under review at Physical Review D (PRD)*.

[3] Haihao Shi*, **Zhenyang Huang***, Qiyu Yan, Jun Li, Guoliang Lü, Xuefei Chen. (2025). **Hunting Hidden Axion Signals in Pulsar Dispersion Measurements with Machine Learning**. *arXiv:2505.16562* (preprint). *Under review at The Astrophysical Journal (ApJ)*.

[4] Haihao Shi, Junda Zhou, **Zhenyang Huang**, Guoliang Lü, Xuefei Chen. (2025). **Dark Matter (S)pins the Planet**. *arXiv:2503.17206* (preprint). *Under review at Journal of Cosmology and Astroparticle Physics (JCAP)*.

Projects

- **Gravitational Wave Data Exploration: A Practical Training in Programming and Analysis** *Nov.2023 - Sep.2024*
  ICTP, UCAS [Github]
  - Developed machine learning model for gravitational wave data exploration
  - Led the team to win the championship of the final Kaggle competition of the project

Conferences & Presentations

- **11th Youth Astronomical Forum of the Chinese Astronomical Society (YAF-11)** *Aug. 2025*
  Dali, China
  - **Poster:** *Application of Interpretable Data-Driven Methods for the Reconstruction of Supernova Neutrino Energy Spectra Following Fast Neutrino Flavor Conversions* [arXiv:2507.09632]

Skills

- **Programming Languages:** Python (primary), C, C++, CUDA C
- **Data Science & Machine Learning:** PyTorch, NumPy, Astropy, Scikit-learn, TensorFlow
- **Other Tools & Technologies:** Docker, Linux (Ubuntu), Shell Scripting, LaTeX
- **Languages:** Cantonese Chinese (native), Mandarin Chinese (native), English (conversational)