Hongzhe Zhou | **hongzhe.zhou@sjtu.edu.cn** | **November, 2023**

Personal Information	Born in 1992 in Shanghai, China	
Research Interests	Theoretical and computational astrophysics Plasma astrophysics and dynamo theories of stars, galaxies, and accretion engines Astrophysical turbulence	

Education

- M.A. and Ph.D., University of Rochester, Rochester, NY, U.S.A. — 2015-2020
  Theoretical astrophysics. Advisor: Eric G. Blackman, Ph.D.
- B.S., Fudan University, Shanghai, China — 2011-2015
  Physics

Professional Appointments

- Postdoc Fellow, Tsung-Dao Lee Institute, Shanghai Jiao Tong University — 2022-present
- Nordita Postdoc Fellowship, Nordic Institute for Theoretical Physics (Nordita) — 2020-2022

Academic activities

Co-organizer of Nordita Winter School 2022 - Waves in Astrophysics, Nordita — 2022
Undergraduate research at Fudan University — 2014-2015
- Holographic entropy in a topologically massive gravity theory. Supervisor: Lingyan Hung, Ph.D
- Laboratory work on electron-beam evaporation sources. Supervisor: Donglai Feng, Ph.D

Fellowships and Awards

University of Rochester
- Horton Fellowship, Laboratory for Laser Energetics — 2017-2020
- Okubo Prize (for 1st place in the graduate written comprehensive examination) — 2017

Fudan University
- Honors Student Award in Physics, National Top Talent Undergraduate Training Program — 2015
- Second Prize of the Scholarship for Outstanding Students — 2012-2014
- Scholarship for Freshman — 2011

Teaching Experience

Department of Astronomy, Stockholm University
- AS7019 - Astrophysical magnetohydrodynamics. — Spring 2022
  Co-lecturer. Shared credit with Dhrubaditya Mitra, Ph.D

Department of Physics and Astronomy, University of Rochester
- AST 231 - Special and General Relativity. Temporary Lecturer — Fall 2018
- AST 231 - Gravity. Teaching Assistant. — Fall 2016
- PHY 121P - Mechanics Mastery/Self-paced. Teaching Assistant. — Spring 2016
- PHY 122P - Electricity and Magnetism Mastery/Self-paced. Teaching Assistant. — Fall 2015

Computer Programming

- The `Pencil Code`: Developer (in Fortran), and one of the 20 owners of the code who have the privilege to give others check-in rights. The `Pencil Code` is a high-order finite-difference code for compressible hydrodynamic flows with magnetic fields and particles, with a large community of more than 108 users.
- Mathematica: Both numerical and symbolic programming.
- Python, C++: Beginner.

Grants

- General funding from the China Postdoctoral Science Foundation — 2023

Presentations

- Purple Mountain Observatory, Nanjing, China — October 2023
  Decay laws of helical and nonhelical magnetically-dominated MHD turbulence
- University of Graz, Graz, Austria — September 2023
  Pencil Code User Meeting 2023
  Helical and nonhelical large-scale dynamos in thin accretion disks

- Institute for Advanced Study, Tsinghua University — March 2023
  New perspectives on the shear dynamo problem
- Tsung-Dao Lee Institute, Shanghai Jiao Tong University — October 2022
  TDLI Astrophysics Seminar
  Developments in the shear dynamo problem
- Nordita — September 2022
  Virtual Nordic Dynamo Seminar
  Scaling of the Hosking integral in decaying magnetically-dominated turbulence
- Nordita — June 2022
  Program: Magnetic field evolution in low density or strongly stratified plasmas
  Scaling of the Saffman helicity integral in decaying magnetically-dominated turbulence
- Nordita — May 2022
  Program: Magnetic field evolution in low density or strongly stratified plasmas
  Correlation times of velocity and kinetic helicity fluctuations in rotating and shearing turbulence
- Nordita — May 2022
  Pencil Code User Metting 2022
  Tutorial and updates on the Mathematica package for the Pencil Code
- Nordita — May 2022
  Pencil Code User Metting 2022
  Correlation times of velocity and kinetic helicity fluctuations in rotating and shearing turbulence
- Nordita — May 2021
  Virtual Nordic Dynamo Seminar
  On the shear-current effect: toward understanding why theories and simulations have mutually and separately conflicted
- Nordita — May 2021
  Pencil Code User Meeting 2021
  On the shear-current effect: toward understanding why theories and simulations have mutually and separately conflicted
- Nordita — September 2020
  Nordita Astrophysics Seminar
  Precision of mean-field theories in Astrophysics with applications to dynamos and accretion disks
- Center for Computational Astrophysics, Flatiron Institute — August 2019
  Summer School 2019: Multiscale Modeling of Astrophysical and Space Plasmas
  Minimal-energy state in accretion disk coronae and towards a holistic accretion model
- University of Rochester — February 2019
  3rd Annual Graduate Student Research Meeting
  Astrophysical dynamos
- University of Rochester — February 2019
  Journal club of Astrophysics
  Kinematic α effect in mean-field dynamos
- University of Rochester — March 2018
  Qualifying Examination for Ph.D. degree
  New perspectives on mean-field dynamo theories
- University of Rochester — March 2018
  Journal club of Astrophysics
  Derivation and precision of mean-field electrodynamics with mesoscale fluctuations

Refereed Publications

1. **Zhou, H.**, 2024. Helical and nonhelical large-scale dynamos in thin accretion discs. *Monthly Notices of the Royal Astronomical Society, 527(2), pp.3018–3028.*

2. Brandenburg, A., **Zhou, H.**, and Sharma, R., 2022. Batchelor, Saffman, and Kazantsev spectra in galactic small-scale dynamos. *Monthly Notices of the Royal Astronomical Society, 518(3), pp.3312–3325.*

3. **Zhou, H.**, Sharma, R., and Brandenburg, A., 2022. Scaling of the Saffman helicity integral in decaying magnetically-dominated turbulence. *Journal of Plasma Physics, 88, p. 905880602.*

4. **Zhou, H.** and Blackman, E. G., 2021. On the shear-current effect: toward understanding why theories and simulations have mutually and separately conflicted. *Monthly Notices of the*

Royal Astronomical Society, 507(4), pp.5732–5746.

5. **Zhou, H.** and Blackman, E. G., 2021. Influence of inhomogeneous stochasticity on the falsifiability of mean-field theories and examples from accretion disc modeling. *Monthly Notices of the Royal Astronomical Society, 507(2), pp.2735–2743.*

6. **Zhou, H.** and Blackman, E. G., 2018. Calculating turbulent transport tensors by averaging single-plume dynamics and application to dynamos. *Monthly Notices of the Royal Astronomical Society: Letters, 483(1), pp.L104-L108.*

7. **Zhou, H.**, Blackman, E. G. and Chamandy, L., 2018. Derivation and precision of mean field electrodynamics with mesoscale fluctuations. *Journal of Plasma Physics, 84(3), p. 735840302.* Selected by the Editorial Board of the JPP as one of the "Featured Articles".

8. **Zhou, H.** and Blackman, E. G., 2017. Some consequences of shear on galactic dynamos with helicity fluxes. *Monthly Notices of the Royal Astronomical Society, 469(2), pp.1466-1475.*

9. Cheng, L., Hung, L. Y., Liu, S. N. and **Zhou, H.Z.**, 2016. First law of entanglement entropy in topologically massive gravity. *Physical Review D, 94(6), p.064063.*

Submitted work

1. **Zhou, H.** and Blackman, E. G., 2023. Helical dynamo growth at modest versus extreme magnetic Reynolds numbers. *arXiv-eprints*, page arXiv:2302.06042. Submitted to *Physical Review Letters*.

Other Archived Publications

1. **Zhou, H.** and Blackman, E. G., 2019. Generalized quenching of large-scale dynamos for helical and non-helical flows. *arXiv-eprints*, page arXiv:1905.01256.

Refereeing

Monthly Notices of the Royal Astronomical Society, The Astrophysical Journal, Astronomy & Astrophysics, Galaxies