



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. Theoretical astrophysics. Advisor: Eric G. Blackman, Ph.D. B.S., Fudan University, Shanghai, China Physics	2015-2020 2011-2015
PROFESSIONAL APPOINTMENTS	Postdoc Fellow, Tsung-Dao Lee Institute, Shanghai Jiao Tong University Nordita Postdoc Fellowship, Nordic Institute for Theoretical Physics (Nordita)	2022-present 2020-2022
ACADEMIC ACTIVITIES	Co-organizer of Nordita Winter School 2022 - Waves in Astrophysics, Nordita Undergraduate research at Fudan University • 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.	2022 2014-2015
FELLOWSHIPS AND AWARDS	University of Rochester • Horton Fellowship, Laboratory for Laser Energetics • Okubo Prize (for 1st place in the graduate written comprehensive examination) Fudan University • Honors Student Award in Physics, National Top Talent Undergraduate Training Program • Second Prize of the Scholarship for Outstanding Students • Scholarship for Freshman	2017-2020 2017 2015 2012-2014 2011
TEACHING EXPERIENCE	Department of Astronomy, Stockholm University • AS7019 - Astrophysical magnetohydrodynamics. 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 • AST 231 - Gravity. Teaching Assistant. • PHY 121P - Mechanics Mastery/Self-paced. Teaching Assistant. • PHY 122P - Electricity and Magnetism Mastery/Self-paced. Teaching Assistant.	Spring 2022 Fall 2018 Fall 2016 Spring 2016 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 <i>Decay laws of helical and nonhelical magnetically-dominated MHD turbulence</i> • University of Graz, Graz, Austria Pencil Code User Meeting 2023 <i>Helical and nonhelical large-scale dynamos in thin accretion disks</i>	October 2023 September 2023

- 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 Meeting 2022
Tutorial and updates on the Mathematica package for the Pencil Code
- Nordita May 2022
Pencil Code User Meeting 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.**, 2023. Helical and nonhelical large-scale dynamos in thin accretion discs. Accepted by *Monthly Notices of the Royal Astronomical Society*.
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.

REFEREING

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