

Hongyang Zhou

hongyang@bu.edu · [Github](#)

EMPLOYMENT

Boston University Research Scientist	Boston, MA 2023/10-now
University of Helsinki Postdoctoral Researcher	Helsinki, Finland 2020/11-2023/05
University of Michigan Research Assistant	Ann Arbor, MI 2015/08-2020/09

EDUCATION

University of Michigan Ph.D of Climate and Space Sciences and Scientific Computing	Ann Arbor, MI 2015/08-2020/09
University of Science and Technology of China (USTC) Bachelor of Geophysics	Anhui, China 2011/09-2015/06

AWARDS

University of Michigan Climate and Space Sciences Outstanding Doctoral Student Research Award	2020
University of Michigan Michigan Institute for Computational Discovery and Engineering Fellowship	2016
USTC Outstanding Teaching Scholarship	2015
USTC The First Prize, Outstanding Student Scholarship	2014

EXPERIENCE

Planetary Magnetosphere Modeling <i>Supervisor: Chuanfei Dong</i> <ul style="list-style-type: none">Studying Earth and planetary magnetospheres with numerical simulationsDeveloping kinetic shock and foreshock models	2023/10-now
Hybrid Vlasov Ultra-Low Frequency (ULF) Wave Simulations <i>Supervisor: Lucile Turc & Minna Palmroth</i> <ul style="list-style-type: none">Developed time-varying boundary conditions in Vlasiator and the postprocessing package Vlasiator.jlStudied ULF waves properties in Earth's magnetosheath and foreshock using global 2D simulations	2020/11-2023/05
SWMF Model Development <i>Supervisor: Gábor Tóth</i> <ul style="list-style-type: none">Developed new boundary setups and extended MPI-OpenMP parallel code capability for BATS-R-USDeveloped an open-source package Batsrus.jl for efficient data processing, analysis and visualizationInitiated a GPU-portable magnetohydrodynamic (MHD) solver with OpenACC, OpenMP & CUDA	2015-2020
MHD-EPIC Simulation of Ganymede's Magnetosphere <i>Supervisor: Gábor Tóth & Xianzhe Jia</i> <ul style="list-style-type: none">Constructed a global magnetosphere model by coupling Hall MHD with Particle-In-Cell in generalized coordinatesAnalyzed the magnetic reconnection processes at Ganymede	2016-2020

TEACHING

Space Applications of Plasma Physics

Guest Lecturer

University of Helsinki

2022

Plasma Physics

Guest Lecturer

University of Helsinki

2022

Electrodynamics

Teaching Assistant

USTC

2015

SKILLS

Programming Languages - Julia, Fortran, C, C++, MATLAB, Python, IDL, CUDA, Rust, Perl, LaTeX

3D Visualization & Rendering - Paraview, VisIt, Tecplot

Languages - English, Mandarin

PUBLICATIONS

Anomalous Transient Enhancement of Planetary Ion Escape at Mars

*Zhang, Chi and Dong, Chuanfei and **Zhou, Hongyang** and Halekas, Jasper and Yamauchi, Masatoshi and Nilsson, Hans and Liu, Terry and Persson, Moa and Curry, Shannon and Dong, Yaxue and Futaana, Yoshifumi and Chen, Yuxi and Zhou, Muni and Suranga, Ruhunusiri and Hanley, Kathleen and Mazelle, Christian and Xu, Shaosui and Ramstad, Robin and Holmstrom, Mats and Chen, Li-Jen, Nature Communications, 2025*

Observational characteristics of electron distributions in the Martian induced magnetotail

*Zhang, Chi and Dong, Chuanfei and **Zhou, Hongyang** and Deca, Jan and Xu, Shaosui and Harada, Yuki and Curry, Shannon M and Mitchell, David L and Liu, Zhi-Yang and Qin, Junfeng and others, Geophysical Research Letters, 2025*

Interplay of magnetic reconnection and current sheet kink instability in the Earth's magnetotail

*Cozzani, Giulia and Alho, M and Zaitsev, Ivan and **Zhou, Hongyang** and Hoilijoki, Sanni and Turc, Lucile and Grandin, Maxime and Horaites, Konstantinos and Battarbee, Markus and Pfau-Kempf, Yann and others, Geophysical Research Letters, 2025*

The Vlasiator 5.2 Ionosphere–Coupling a magnetospheric hybrid-Vlasov simulation with a height-integrated ionosphere model

Ganse, Urs and Pfau-Kempf, Yann and Zhou, Hongyang and Juusola, Liisa and Workayehu, Abiyot and Kebede, Fasil and Papadakis, Konstantinos and Grandin, Maxime and Alho, Markku and Battarbee, Markus and others, Geoscientific Model Development Discussions, 2024

Hybrid-Vlasov modelling of ion velocity distribution functions associated with the Kelvin-Helmholtz instability with a density and temperature asymmetry

*Tarvus, Vertti and Lurc, Lucile and **Zhou, Hongyang** and Nakamura, Takuma and Settino, Adriana and Blasl, Kevin and Cozzani, Giulia and others, AAS, 2024*

Source of Drift-dispersed Electrons in Martian Crustal Magnetic Fields

*Zhang, Chi and **Zhou, Hongyang** and Dong, Chuanfei and Harada, Yuki and Yamauchi, Masatoshi and Xu, Shaosui and Nilson, Hans and Ebihara, Yusuke and Curry, Shannon M. and Qin, Junfeng and Mitchell, David L. and Brain, David A., Astrophysical Journal, 2024*

Finding reconnection lines and flux rope axes via local coordinates in global ion-kinetic magnetospheric simulations

*Alho, M., Cozzani, G., Zaitsev, I., Kebede, F. T., Ganse, U., Battarbee, M., Bussov, M., Dubart, M., Hoilijoki, S., Kotipalo, L., Papadakis, K., Pfau-Kempf, Y., Suni, J., Tarvus, V., Workayehu, A., **Zhou, H.**, and Palmroth, M., Annales Geophysicae, 2024*

Kinetic signatures, dawn-dusk asymmetries, and flux transfer events associated with Mercury's dayside magnetopause reconnection from 3D MHD-AEPIC simulations

*Li, Changkun and Jia, Xianzhe and Chen, Yuxi and Tóth, Gábor and **Zhou, Hongyang** and Slavin, James A and Sun, Weijie and Poh, Gangkai, JGR, 2024*

Dayside Pc2 Waves Associated With Flux Transfer Events in a 3D Hybrid-Vlasov Simulation

*Tesema, Facil and Palmroth, Minna and Turc, Lucile and **Zhou, Hongyang** and Cozzani, Giulia and Alho, Markku and Pfau-Kempf, Yann and Horaites, Konstantinos and Zaitsev, Ivan and Grandin, Maxime, GRL, 2024*

Vlasiator. jl: A Julia package for processing Vlasiator data

Zhou, Hongyang, Journal of Open Source Software, 2023

FLEKS: A flexible particle-in-cell code for multi-scale plasma simulations

Chen, Yuxi and Tóth, Gábor and Zhou, Hongyang and Wang, Xiantong, CPC, 2023

Enabling technology for global 3D + 3V hybrid-Vlasov simulations of near-Earth space

Ganse, U. and Koskela, T. and Battarbee, M. and Pfau-Kempf, Y. and Papadakis, K. and Alho, M. and Bussov, M. and Cozzani, G. and Dubart, M. and George, H. and Gordeev, E. and Grandin, M. and Horaites, K. and Suni, J. and Tarvus, V. and Kebede, F. T. and Turc, L. and Zhou, H. and Palmroth, M., Physics of Plasmas, 2023

Magnetospheric Response to a Pressure Pulse in a Three-Dimensional Hybrid-Vlasov Simulation

Horaites, Konstantinos and Rintamäki, E and Zaitsev, I and Turc, L and Grandin, M and Cozzani, G and Zhou, Hongyang and Alho, M and Suni, J and Kebede, F and others, JGR, 2023

Magnetotail plasma eruptions driven by magnetic reconnection and kinetic instabilities

Palmroth, Minna and Pulkkinen, Tuija I and Ganse, Urs and Pfau-Kempf, Yann and Koskela, Tuomas and Zaitsev, Ivan and Alho, Markku and Cozzani, Giulia and Turc, Lucile, Zhou, Hongyang and others, Nature Geoscience, 2023

First 3D hybrid-Vlasov global simulation of auroral proton precipitation and comparison with satellite observations

Grandin, M. and Luttikhuis, T. and Battarbee, M. and Cozzani, G. and Zhou, H. and Turc, L. and Pfau-Kempf, Y., Journal of Space Weather and Space Climate, 2023

Magnetospheric responses to solar wind Pc5 density fluctuations: Results from 2D hybrid Vlasov simulation

Zhou, Hongyang and Turc, Lucile and Pfau-Kempf, Yann and Battarbee, Markus and Tarvus, Vertti and Dubart, Maxime and George, Harriet and Cozzani, Giulia and Grandin, Maxime and Ganse, Urs, Frontiers in Astronomy and Space Sciences, 2022

A global view of Pc3 wave activity in near-Earth space: Results from hybrid-Vlasov simulations

Turc, Lucile and Zhou, Hongyang and Tarvus, Vertti and Ala-Lahti, Matti and Battarbee, Markus and Pfau-Kempf, Yann and Johlander, Andreas and Ganse, Urs and Dubart, Maxime and George, Harriet and others, Frontiers in Astronomy and Space Sciences, 2022

Quasi-parallel Shock Reformation Seen by Magnetospheric Multiscale and Ion-kinetic Simulations

A. Johlander and M. Battarbee and L. Turc and U. Ganse and Y. Pfau-Kempf and M. Grandin and J. Suni and V. Tarvus and M. Bussov and H. Zhou and others, GRL, 2022

Estimating inner magnetospheric radial diffusion using a hybrid-Vlasov simulation

H. George and E. Kilpua and A. Osmane and S. Lejosne and L. Turc and M. Grandin and M. M. H. Kalliokoski and S. Hoilijoki and U. Ganse and M. Alho and M. Battarbee and M. Bussov and M. Dubart and A. Johlander and T. Manglayev and K. Papadakis and Y. Pfau-Kempf and J. Suni and H. Zhou and M. Palmroth, Frontiers in Astronomy and Space Sciences, 2022

Reconnection-driven dynamics at Ganymede's upstream magnetosphere: 3-D global Hall MHD and MHD-EPIC simulations

Zhou, Hongyang and Tóth, Gábor and Jia, Xianzhe and Chen, Yuxi, JGR, 2020

Efficient OpenMP parallelization to a complex MPI parallel magnetohydrodynamics code

Zhou, Hongyang and Tóth, Gábor, Journal of Parallel and Distributed Computing, 2020

Embedded kinetic simulation of Ganymede's magnetosphere: Improvements and inferences

Zhou, Hongyang and Tóth, Gábor and Jia, Xianzhe and Chen, Yuxi and Markidis, Stefano, JGR, 2019