Hongyang Zhou

hongyang@bu.edu · Github

EMPLOYMENT

Boston University — Boston, MA
Research Scientist — 2023/10-now

University of Helsinki — Helsinki, Finland
Postdoctoral Researcher — 2020/11-2023/05

University of Michigan — Ann Arbor, MI
Research Assistant — 2015/08-2020/09

EDUCATION

University of Michigan — Ann Arbor, MA
Ph.D of Climate and Space Sciences and Scientific Computing — 2015/08-2020/09

University of Science and Technology of China (USTC) — Anhui, China
Bachelor of Geophysics — 2011/09-2015/06

AWARDS

University of Michigan — 2020
Climate and Space Sciences Outstanding Doctoral Student Research Award

University of Michigan — 2016
Michigan Institute for Computational Discovery and Engineering Fellowship

USTC — 2015
Outstanding Teaching Scholarship

USTC — 2014
The First Prize, Outstanding Student Scholarship

EXPERIENCE

Planetary Magnetosphere Modeling — 2023/10-now
Supervisor: Chuanfei Dong

- Studying Earth and planetary magnetosphere with numerical simulations
- Developing kinetic shock and foreshock models

Understanding Ultra-Low Frequency (ULF) Waves in Hybrid Vlasov Simulations — 2020/11-2023/05
Supervisor: Lucile Turc & Minna Palmroth

- Developed time-varying boundary conditions in Vlasiator and the postprocessing package Vlasiator.jl
- Studied ULF waves properties in Earth's magnetosheath and foreshock region using global 2D simulations

Numerical model development for SWMF — 2015-2020
Supervisor: Gábor Tóth

- Developed new boundary setups and extended MPI-OpenMP parallel code capability for BATS-R-US
- Developed an open-source package Batsrus.jl for efficient data processing, analysis and visualization
- Initiated a GPU-portable magnetohydrodynamic (MHD) solver with OpenACC, OpenMP & CUDA

MHD-EPIC simulation of Ganymede's magnetosphere — 2016-2020
Supervisor: Gábor Tóth & Xianzhe Jia

- Constructed a global magnetosphere model by coupling Hall MHD with Particle-In-Cell in generalized coordinates
- Analyzed the magnetic reconnection processes at Ganymede

SELECTED PUBLICATIONS

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

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, H** 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

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

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

SKILLS

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

Visualization Tools - Paraview, VisIt, Tecplot

Languages - English, Chinese