Curriculum Vitae

Keheng Zhu
PhD Student in Climate & Space Sciences & Engineering
University of Michigan

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Education

Aug. 2025 – Present **University of Michigan**, Ann Arbor, MI, USA
Ph.D. student in Climate & Space Sciences and Engineering
Focus: Space Physics

Sept. 2021 – Jun. 2025 **University of Science and Technology of China**, Hefei, Anhui, China
B.S. in Applied Physics
Department of Engineering and Applied Physics, School of Physical Sciences

Research Experience

First-Principles Simulation of Collisions in Fully Ionized Plasmas

School of Nuclear Science and Technology, University of Science and Technology of China
Advisor: *Jian Liu* Email: jliuphy@ustc.edu.cn

- Enhanced the Accurate Particle Tracer (APT) Program to conduct detailed plasma collision simulations with advanced parallelism features, and developed an innovative method to define collision times in plasma physics, providing new insights into particle trajectories and velocity distributions.
- Conducted a thorough analysis of simulation results, proposing avenues for further research to deepen our understanding of plasma collision phenomena.
- **Received an *Excellent* rating in the University Student Research Project review by the School of Nuclear Science and Technology.**

Presentation at *the Second National Conference on Controlled Nuclear Fusion and Artificial Intelligence Technology*

Southwestern Institute of Physics, Chengdu, China

- Hosted by the Fusion and Plasma Physics Division of the Chinese Nuclear Society from April 26th to April 28th, 2023.
- Presented a 15-minute report titled "First-Principles Simulation of Plasma Collisions", showcasing the utilization of the APT program for simulating plasma collisions.

Integrating Chromosphere-Corona Coupling into the Space Weather Modeling Framework

Climate and Space Sciences and Engineering, University of Michigan
Advisor: *Igor Sokolov* Email: igorsok@umich.edu

- Mastered knowledge in computational fluid dynamics, magnetohydrodynamics, and the chromosphere transition region of the Sun. Skilled in applying numerical methods such as TVD-MUSCL scheme, Strang splitting, and finite volume methods for code development. Developed a C++ code for the chromosphere, which was successfully coupled with a Fortran code. Additionally, derived a model for the plasma thermal conductivity in the chromosphere.
- Submitted an abstract titled "**Integrating Chromosphere-Corona Coupling into the Space Weather Modeling Framework**" to the AGU 2024 Meeting, where I am the first author. The abstract was accepted on October 1st, and I will present my work in the form of a poster during the conference in December.

Course Projects

- **Gamma Ray Ranging for Spacecraft Landings** (College Physics Experiment IV): Introduces Gamma Ray Ranging for spacecraft landings, validating its practical viability by measuring distances with corrected light intensity using Monte Carlo method.
- **Numerical Simulations of Rutherford Scattering**(Atomic Physics A): Simulates Rutherford Scattering using first-principles numerical methods, and analyzes the results to rectify the Rutherford Scattering formula. This project has won the **1st prize** in the Seminar project on Atomic Physics.

Awards and Honors

- 1st prize in in Seminar project on Atomic Physics. June, 2023
- 2022 Outstanding Student Scholarship Bronze Award. December, 2022
- 2021 Outstanding Student Scholarship Silver Award. January, 2022
- 2nd prize in National Olympiad in Informatics in Provinces (NOIP) Advanced Division. 2018

Skills

- **English Test:** TOEFL 106 (Reading 28, Listening 30, Speaking 24, Writing 24)
- **Programming Languages:** C/C++, Python, MATLAB, Fortran
- **Software:** Mathematica, MPI, Git, Linux, LaTeX