Hao Ran

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Research Interests

- Solar wind, space plasma physics, interplanetary magnetic field, space weather.
- Solar flares, coronal mass ejections, filaments, active regions.
- Statistical methods, observational methods, and machine learning methods in solar physics and space science.

Education

2024.09 - present Ph.D. Student in Space Physics at **Mullard Space Science Laboratory, Department of Climate and Space Physics, University College London**
Supervisor: Prof. Daniel Verscharen

2021.09 - 2024.06 Master's Degree in Space Physics at **National Space Science Center, CAS & University of Chinese Academy of Sciences**
Supervisor: Prof. Ying Liu

2017.09 - 2021.06 Bachelor's Degree in Astronomy at **School of Astronomy and Space Science, Nanjing University**
Supervisor: Prof. Yang Guo

Scientific Talks

- 2025.05 **In situ Heliospheric science meeting**
  - *A pipeline for Separating Solar Orbiter Proton Alpha-particle Sensor (PAS) Measurements*
  - Lyon, France
- 2025.04 **Spring Magnetosphere, Ionsphere, and Solar-Terrestrial (MIST) 2025**
  - *Using GMM to Separate Ion Components in PAS Measurements*
  - Leicester, United Kingdom
- 2024.11 **Autumn Magnetosphere, Ionsphere, and Solar-Terrestrial (MIST) 2024**
  The Alpha Drift in the Young Solar Wind measured by Parker Solar Probe
  - Birmingham, United Kingdom
- 2023.12 **Graduate Research for National Service Symposium in Space Physics**
  - *The Alpha-Proton Differential Flow in the near-Sun Solar Wind*
  - Peking University, Beijing, China
- 2023.10 **1st ASO-S and CHASE Joint Conference**
  - *The Alpha-Proton Differential Flow in the Alfvénic Young Solar Wind: From Sub-Alfvénic to Super-Alfvénic*
  - Wuxi, Jiangsu Province, China.
- 2023.05 **"Waves of Science" Seminar of NSSC**
  - *How I Developed the Idea for my First Paper*
  - NSSC, Beijing, China
- 2023.04 **20th National Solar-Terrestrial Space Science Seminar**
  - *Relationship between Successive Flares in the Same Active Regions and SHARP Parameters*
  - Fuzhou, Fujian Province, China.

Awards and Honors

2024.04	STFC Studentship	**UK Research and Innovation**
2024.04	UCL's International Scholar Awards for Doctoral Training Ceters	**University College London**
2023.10	National Scholarship for Graduate Students	**Chinese Academy of Sciences**
2023.04	Excellent Paper for Young Researchers (4/57)	**20th National Solar-Terrestrial Space Science Seminar**
2021.09	The Undergraduates' Scholarship	**National Space Science Center, Chinese Academy of Sciences**
2019.04	The People's Scholarship in China	**Nanjing University**

Skills

Language	Mandarin Chinese (Native); English (Fluent)
Programming	Python (proficient), IDL, C, C++, Fortran, R, MATLAB, LaTeX

Reference

- **Prof. Daniel Verscharen**
  Mullard Space Science Laboratory, University College London;
  Holmbury Hill Rd, Dorking, RH5 6NT, United Kingdom;
  d.verscharen@ucl.ac.uk
- **Prof. Ying Liu**
  State Key Laboratory of Space Weather, National Space Science Center, CAS;
  No.1 Nanertiao Road, Zhongguancun, Haidian District, Beijing 100190, China;
  liuxying@swl.ac.cn
- **Prof. Yang Guo**
  School of Astronomy and Space Science, Nanjing University;
  No.163 Xianlin Road, Qixia District, Nanjing 210023, China;
  guoyang@nju.edu.cn

Publications

As first author:

Hao Ran, Ying D. Liu, Yang Guo, and Rui Wang (Sept. 2022). "Relationship between Successive Flares in the Same Active Region and SHARP parameters". In: *The Astrophysical Journal* 937.1, p. 43. URL: https://iopscience.iop.org/article/10.3847/1538-4357/ac80fa.

Hao Ran, Ying D. Liu, Chong Chen, and Parisa Mostafavi (Feb. 2024). "The Alpha-Proton Differential Flow in the Alfvénic Young Solar Wind: From Sub-Alfvénic to Super-Alfvénic". In: *the Astrophysical Journal* 963, p. 82. URL: https://doi.org/10.3847/1538-4357/ad2069.

As significant-contributing author:

Liu, Ying D., **Hao Ran**, Huidong Hu, and Stuart D. Bale (Feb. 2023). "On the Generation and Evolution of Switchbacks and the Morphology of the Alfvénic Transition: Low Mach-number Boundary Layers". In: *The Astrophysical Journal* 944.2, p. 116. DOI: 10.3847/1538-4357/acb345. URL: https://dx.doi.org/10.3847/1538-4357/acb345.

Liu, Ying D., Bei Zhu, **Hao Ran**, Huidong Hu, Mingzhe Liu, Xiaowei Zhao, Rui Wang, Michael L. Stevens, and Stuart D. Bale (Feb. 2024). "Direct In Situ Measurements of a Fast Coronal Mass Ejection

and Associated Structures in the Corona". In: *the Astrophysical Journal* 963, p. 85. URL: https://doi.org/10.3847/1538-4357/ad1e56.

Other co-authored papers:

Cheng, Wenshuai, Ying D. Liu, **Hao Ran**, Yiming Jiao, Michael L. Stevens, and Justin C. Kasper (Apr. 2024). "Origin and Properties of the Near Subsonic Solar Wind Observed by Parker SolarProbe". In: *the Astrophysical Journal* 967, p. 58. URL: https://iopscience.iop.org/article/10.3847/1538-4357/ad3b98.

Jiao, Yiming, Ying D Liu, Wenshuai Cheng, **Ran, Hao**, and Rui Wang (2024a). "On the Acceleration of the Young Solar Wind from Different Source Regions". In: *The Astrophysical Journal Letters* 975.2, p. L41. URL: https://iopscience.iop.org/article/10.3847/2041-8213/ad85ea.

Jiao, Yiming, Ying D. Liu, **Ran, Hao**, and Wenshuai Cheng (Jan. 2024b). "Properties of Steady Sub-Alfvénic Solar Wind in Comparison with Super-Alfvénic Wind from Parker Solar Probe Measurements". en. In: *The Astrophysical Journal* 960.1, p. 42. DOI: 10.3847/1538-4357/ad0dfe. URL: https://iopscience.iop.org/article/10.3847/1538-4357/ad0dfe.

Outresearch Experience

1. **Volunteer teaching in rural areas.** (Guizhou & Sichuan) 2018.07 & 2019.07
   - Responsible for the *Introduction to Astronomy* Course.
   - Obtained the "*Most Welcomed Teacher*" award.
2. **Amateur soccer player.** (Nanjing University) 2017.09 - 2021-06
   - Second place in the Nanjing University Champions League. (Season 2018-2019)
   - First place in the Nanjing University Champions Cup. (Season 2017-2018)