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Kun Zhang

Curriculum Vitae

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Dr. Kun Zhang has a broad research interest in various topics in the field of magnetospheric physics, including radiation belt dynamics, electron precipitation, and dayside interactions. Her research integrates the analysis of satellite data, numerical simulations, and plasma theory. She actively participates in community service through outreach and peer review activities.

Employment

Assistant Researcher, *University of California Los Angeles, Los Angeles, CA* — Sept 2023 — present
Postdoctoral Researcher, *Space Science Institute, Boulder, CO* — Aug 2020 — Aug 2023

Education

Ph.D. in Aerospace Engineering, *University of Colorado Boulder, Boulder, CO* — Aug 2020
Thesis title: Findings on the characteristics of radiation belt electrons: precipitation loss, CRAND source and upper flux limit
B.S. in Space Science & Technology, *Peking University, Beijing, China* — July 2015
B.S. in Computer Science, *Peking University, Beijing, China* — July 2015

Funds

NASA Early Career Investigator Program 80NSSC23K1059 (Principal Investigator) — 2023 — 2027
The generation mechanisms of foreshock ULF wave harmonics.
NSF GEM AGS-2247758 (Principal Investigator) — 2023 — 2026
How upstream solar wind conditions determine the properties of the foreshock backstreaming ions

Awards and Fellowships

NASA Earth and Space Science Fellowship (NESSF), *NASA* — 2017 — 2020
Dean's Fellowship, *University of Colorado Boulder* — 2015 — 2016
John T. Gosling Endowed Fellowship, *Laboratory for Atmospheric and Space Physics* — Sept 2015
Awards for Excellent Students, *Peking University* — 2013 — 2014

Skills

Programming — Fluent: Python & IDL; Familiar: MATLAB, C/C++ & FORTRAN
Communication — English & Mandarin

Activities

Organizer, Researcher Lunch Seminars, EPSS, UCLA — Sept 2024-present
Review Editor, Frontiers in Astronomy and Space Sciences — 2023-present
Booth: Our Magnetic Sun, EXPLORE YOUR UNIVERSE outreach event, UCLA — 2022, 2023
Chair of Session SM33A: Dayside Magnetopshere Interactions II Oral, AGU Fall Meeting — 2022
Reviewer for journals, JGR Space Physics, GRL, Space Weather, PoP, etc.

Publications

1. **Zhang, K.**, Artemyev, A., Li, X., Zhang, X.-J., Angelopoulos, V., Mei, Y., Xiang, Z., and Grimmich, N. (2024), Nightside electron precipitation patterns as observed by ELFIN and CIRBE CubeSats, *Journal of Geophysical Research: Space Physics*, 129, e2024JA033051.
2. Shi,C., Velli, M., Toth, G., **Zhang, K.**, Tenerani, A., Huang, Z., Sioulas, N., and van der Holst., B. (2024), Analytic Model and Magnetohydrodynamic Simulations of Three-dimensional Magnetic Switchbacks, *The Astrophysical Journal Letters*, 964(2), L28.
3. Liu, T. Z., Angelopoulos, V., Vu, A., Zhang, H., Otto, A., and **Zhang, K.** (2024). THEMIS observations of magnetosheath-origin foreshock ions. *Journal of Geophysical Research: Space Physics*, 129, e2023JA031969.
4. Dorfman, S., **Zhang, K.**, Turc, L., Ganse, U., and Palmroth, M. (2023). Probing the foreshock wave boundary with single spacecraft techniques. *Journal of Geophysical Research: Space Physics*, 128(9), e2023JA031724.
5. Khoo, L.-Y., Li, X., Selesnick, R. S., Schiller, Q., **Zhang, K.**, Zhao, H., Hogan, B., Cantilina, J. T., Sims, A., Bauch, E., Valade, T., Boyajian, S., and Kohnert, R. (2022). On the Challenges of Measuring Energetic Particles in the Inner Belt: A Geant4 Simulation of an Energetic Particle Detector Instrument, REPTile-2. *Journal of Geophysical Research: Space Physics*, 127, e2021JA030249.
6. Liu, Y., Xiang, Z., Ni, B., Li, X., **Zhang, K.**, Fu, S., Gu, X., Liu, J., and Cao, X. (2022). Quasi-trapped electron fluxes induced by NWC transmitter and CRAND: Observations and simulations. *Geophysical Research Letters*, 49, e2021GL097443.

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7. Chu, X., Ma, D., Bortnik, J., Tobiska, W. K., Cruz, A., Bouwer, S. D., Zhao, H., Ma, Q., **Zhang, K.**, Baker, D. N., Li, X., Spence, H., and Reeves, G. (2021). Relativistic electron model in the outer radiation belt using a neural network approach. *Space Weather*, 19, e2021SW002808.
8. Xiang, Z., Li, X., Kapali, S., Gannon, J., Ni, B., Zhao, H., **Zhang, K.**, and Khoo, L. Y. (2021). Modeling the dynamics of radiation belt electrons with source and loss driven by the solar wind. *Journal of Geophysical Research: Space Physics*, 126, e2020JA028988.
9. **Zhang, K.**, Li, X., Zhao, H., Xiang, Z., Khoo, L. Y., Zhang, W., Hogan, B., and Temerin, M. A. (2021). Upper limit of electron fluxes observed in the radiation belts. *Journal of Geophysical Research: Space Physics*, 126, e2020JA028511.
10. Xiang, Z., Li, X., Ni, B., Temerin, M. A., Zhao, H., **Zhang, K.**, and Khoo, L. Y. (2020). Dynamics of energetic electrons in the slot region during geomagnetically quiet times: Losses due to wave-particle interactions versus a source from cosmic ray albedo neutron decay (CRAND). *Journal of Geophysical Research: Space Physics*, 125, e2020JA028042.
11. **Zhang, K.**, Li, X., Xiang, Z., Khoo, L. Y., Zhao, H., Looper, M. D., Temerin, M. A., and Sauvaud, J. A. (2020). Long-term variations of quasi-trapped and trapped electrons in the inner radiation belt observed by DEMETER and SAMPEX. *Journal of Geophysical Research: Space Physics*, 125, e2020JA028086.
12. Li, X., Xiang, Z., **Zhang, K.**, Khoo, L., Zhao, H., Baker, D. N., and Temerin, M. A. (2020). New insights from long-term measurements of inner belt protons (10s of MeV) by SAMPEX, POES, Van Allen Probes, and simulation results. *Journal of Geophysical Research: Space Physics*, 125(8), e2020JA028198.
13. Xiang, Z., Li, X., Temerin, M. A., Ni, B., Zhao, H., **Zhang, K.**, and Khoo, L. Y. (2020). On energetic electron dynamics during geomagnetic quiet times in Earth's inner radiation belt due to atmospheric collisional loss and cosmic ray albedo neutron decay (CRAND) as a source. *Journal of Geophysical Research: Space Physics*, 125, e2019JA027678.
14. Khoo, L.-Y., Li, X., Zhao, H., Chu, X., Xiang, Z., and **Zhang, K.** (2019). How sudden, intense energetic electron enhancements correlate with the innermost plasmapause locations under various solar wind drivers and geomagnetic conditions. *Journal of Geophysical Research: Space Physics*, 124, 8992– 9002.
15. Liu, H., Zong, Q.-G., Zhang, H., Sun, W. J., Zhou, X.-Z., Gershman, D. J., Shi, C., **Zhang, K.**, Le, G., and Pollock, C. (2019). The geometry of an electron scale magnetic cavity in the plasma sheet. *Geophysical Research Letters*, 46, 9308– 9317.
16. Xiang, Z., Li, X., Selesnick, R., Temerin, M. A., Ni, B., Zhao, H., **Zhang, K.**, and Khoo, L. Y. (2019). Modeling the quasi-trapped electron fluxes from cosmic ray albedo neutron decay (CRAND). *Geophysical Research Letters*, 46, 1919– 1928.
17. **Zhang, K.**, Li, X., Zhao, H., Schiller, Q., Khoo, L. -Y., Xiang, Z., Selesnick, R., Temerin, M. A., and Sauvaud, J. A. (2019). Cosmic Ray Albedo Neutron Decay (CRAND) as a Source of Inner Belt Electrons: Energy Spectrum Study, *Geophysical Research Letters*, 46, 2, 544-552.
18. Khoo, L. Y., Li, X., Zhao, H., Sarris, T. E., Xiang, Z., **Zhang, K.**, Kellerman, A. C., and Blake, J. B. (2018). On the initial enhancement of energetic electrons and the innermost plasmapause locations: Coronal mass ejection-driven storm periods. *Journal of Geophysical Research: Space Physics*, 123, 9252– 9264.
19. Li, X., Selesnick, R., Schiller, Q., **Zhang, K.**, Zhao, H., Baker, D. N., and Temerin, M. A. (2017). Measurement of electrons from albedo neutron decay and neutron density in near-Earth space, *Nature*, 552, 382–385.
20. **Zhang, K.**, Li, X., Schiller, Q., Gerhardt, D., Zhao, H., and Millan, R. (2017). Detailed characteristics of radiation belt electrons revealed by CSSWE/REPTile measurements: Geomagnetic activity response and precipitation observation, *Journal of Geophysical Research: Space Physics*, 122, 8, 8434-8445.
21. Li, X., Baker, D. N., Zhao, H., **Zhang, K.**, Jaynes, A. N., Schiller, Q., Kanekal, S. G., Blake, J. B., and Temerin, M. A. (2017). Radiation belt electron dynamics at low L (<4): Van Allen Probes era versus previous two solar cycles, *Journal of Geophysical Research: Space Physics*, 122, 5224– 5234.

Oral Presentations

- The interaction between the solar wind discontinuities and the Earth's bow shock: ARTEMIS observations, *THEMIS/ARTEMIS SWT meeting 2023*.
- Properties of the Foreshock ULF Waves in Their Early Growth Stage Observed in Global Hybrid-Vlasov Simulations, *AGU Fall Meeting, 2023*.
- Foreshock ULF waves as observed in global hybrid-Vlasov simulations, *UCLA Space Physics Seminar, Oct 27, 2023*.
- The early-phase growth of ULF waves in the ion foreshock observed in a hybrid-Vlasov simulation, *GEM summer workshop, 2023*.
- The early-phase growth of ULF waves in the ion foreshock observed in a hybrid-Vlasov simulation, *AGU Fall Meeting 2022*.
- The early-phase growth of ULF waves in the ion foreshock observed in a hybrid-Vlasov simulation, *EGU General Assembly 2022*.
- The Early-phase Growth of ULF Waves in the Ion Foreshock observed in a Hybrid-Vlasov simulation, *THEMIS/ARTEMIS SWT meeting 2022*.

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- Global structure and properties of ULF waves in the ion foreshock observed in a Hybrid-Vlasov simulation, *AGU Fall Meeting 2021*.
- Identifying Global Structure and Properties of ULF waves in the ion foreshock with Vlasiator, a Hybrid-Vlasov simulation, *the Space Science Institute's annual SpaceJam meeting 2021*.
- Global structure and properties of ULF waves in the ion foreshock observed in a Hybrid-Vlasov simulation, *EGU General Assembly 2021*.
- CSSWE's Scientific Highlights: Small mission can solve Big science mystery (**invited**), *Van Allen Probes Community Workshop 2021*.
- Global Structure and Properties of ULF waves in the ion foreshock observed by a Hybrid-Vlasov simulation (**invited**), *5th Asia-Pacific Conference on Plasma Physics (AAPPS-DPP2021)*.
- Long-term variations of inner belt electrons observed by DEMETER and SAMPEX, *AGU fall meeting 2019*.
- Precipitation Loss of Radiation Belt Electrons Observed by LEO Satellites and Balloons, *AOGS meeting 2018*.
- GEM student tutorial on "General inner/outer magnetosphere and heliosphere structure", *GEM summer workshop 2018*.
- Precipitation Loss of Radiation Belt Electrons Observed by LEO Satellites and Balloons, *LASP FOM seminar, 2018*.
- GEM student tutorial on "Mission Overview: Introduction to Current Space Science Missions", *GEM summer workshop 2017*.
- Detailed Characteristics of Radiation Belt Electrons Revealed by CSSWE/REPTile Measurements, *USNC-URSI meeting 2017*.