# Curriculum Vitae

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# Dr. Ling-ling Zhao

## Education

Sep. 2009 – Jul. 2013 **National Space Science Center (NSSC), Chinese Academy of Sciences**, Beijing, China, Ph.D. in Space Physics.
**Thesis title:** Modulation of Galactic Cosmic Rays in the Inner Heliosphere

Sep. 2005 – Jul. 2009 **Henan Normal University (HNU)**, Henan, China, B.S. in Information and Computing science.

## Work Experience

Oct. 2018 – Present **Research Scientist I:** Center for Space Plasma and Aeronomic Research, University of Alabama in Huntsville (UAH).

Mar. 2018 –Oct. 2018 **Postdoctoral research assistant III:** Center for Space Plasma and Aeronomic Research, University of Alabama in Huntsville (UAH).

Mar. 2017 –Mar. 2018 **Visiting scholar:** Center for Space Plasma and Aeronomic Research, University of Alabama in Huntsville (UAH).

Aug. 2014 –Mar. 2018 **Lecturer:** University of Chinese Academy of Sciences (UCAS).

Jul. 2013 – Jul. 2014 **Assistant Researcher:** National Space Science Center, Chinese Academy of Sciences.

## Teaching Experience

2019 **Waves in Fluids**, Department of Space Science, UAH, **Partial**.

2018 **Transport Processes in Space**, Department of Space Science, UAH, **Partial**.

## Journal Papers

[1] **L.-L. Zhao**, G. P. Zank, L. Adhikari, M. Nakanotani, D. Telloni, and F. Carbone, Spectral features in field-aligned solar wind turbulence from Parker Solar Probe observations, *Astrophys. J.*, 898, 113, doi:10.3847/1538-4357/ab9b7e 2020.

[2] **L.-L. Zhao**, G. P. Zank, and L. F. Burlaga, Turbulence in the Very Local Interstellar Medium (VLISM), *Astrophys. J.*, under review, 2020.

[3] **L.-L. Zhao**, G. P. Zank, L. Adhikari, Q. Hu, J. C. Kasper, S. D. Bale, K. E. Korreck, A. W. Case, M. Stevens, J. W. Bonnell, T. Dudok de Wit, K. Goetz, P. R. Harvey, R. J. MacDowall, D. M. Malaspina, M. Pulupa, D. E. Larson, R. Livi, P. Whittlesey, and K. G. Klein, Identification of Magnetic Flux Ropes from Parker Solar Probe Observations during the First Encounter, *Astrophys. J. Supplement*, 246, 26, doi:10.3847/1538-4365/ab4ff1, 2020.

[4] **L.-L. Zhao**, G. P. Zank, Q. Hu, Y. Chen, L. Adhikari, J. A. leRoux, A. Cummings, E. Stone, and L. F. Burlaga, ACR proton acceleration associated with reconnection processes beyond the heliospheric termination shock, *Astrophys. J.*, 886, 144, doi:10.3847/1538-4357/ab4db4, 2019.

[5] **L.-L. Zhao**, G. P. Zank, and L. Adhikari, Generation Mechanisms for Low-energy Interstellar Pickup Ions, *Astrophys. J.*, 879, 32, doi:10.3847/1538-4357/ab2381, 2019.

[6] **L.-L. Zhao**, G. P. Zank, Y. Chen, Q. Hu, J. A. le Roux, S. Du, and L. Adhikari, Particle acceleration at 5 AU associated with turbulence and small-scale magnetic flux ropes, *Astrophys. J.*, 872, 4, doi:10.3847/1538-4357/aafcb2, 2019.

[7] **L.-L. Zhao**, G. P. Zank, O. Khabarova, S. Du, Y. Chen, L. Adhikari, and Q. Hu, An Unusual Energetic Particle Flux Enhancement Associated with Solar Wind Magnetic Island Dynamics, *Astrophys. J. Lett.*, 864, L34, doi:10.3847/2041-8213/aaddf6, 2018.

[8] **L.-L. Zhao**, L. Adhikari, G. P. Zank, Q. Hu, and X. S. Feng, Influence of the Solar Cycle on Turbulence Properties and Cosmic-Ray Diffusion, *Astrophys. J.*, 856, 94, doi:10.3847/1538-4357/aab362, 2018.

[9] **L.-L. Zhao**, L. Adhikari, G. P. Zank, Q. Hu, and X. S. Feng, Cosmic Ray Diffusion Tensor throughout the Heliosphere Derived from a Nearly Incompressible Magnetohydrodynamic Turbulence Model, *Astrophys. J.*, 849, 88, doi:10.3847/1538-4357/aa932a, 2017.

[10] **L.-L. Zhao** and H. Zhang, Transient galactic cosmic ray modulation during solar cycle 24: A comparative study of two prominent Forbush decrease events, *Astrophys. J.*, 827, 13, doi:10.3847/0004-637X/827/1/13, 2016.

[11] **L.-L. Zhao** and H. Zhang, Galactic Cosmic Ray Heavy-ion Modulation During the Successive Peculiar Solar Cycle 23 and 24: Observations from ACE spacecraft, *Astrophys. J.*, 805, 6, doi:10.1088/0004-637X/805/1/6, 2015.

[12] **L.-L. Zhao**, G. Qin, M. Zhang, and B. Heber, Modulation of galactic cosmic rays during the unusual solar minimum of cycle 23 and 24, *J. Geophys. Res.*, 119, 1493, doi:10.1002/2013JA019550, 2014.

[13] **L.-L. Zhao** and G. Qin, An observation-based GCR model of heavy nuclei: Measurements from CRIS onboard ACE spacecraft, *J. Geophys. Res.*, 118, 1837, doi:10.1002/jgra.50235, 2013.

[14] S. Fu, **L.-L. Zhao***, G. P. Zank, M. Wang, and Y. Jiang, An ACE/CRIS-observation-based Galactic Cosmic Rays heavy nuclei spectra model ii, *Science China*, 63, 1, doi:10.1007/s11433-019-9423-3, 2019.

[15] G. P. Zank, M. Nakanotani, **L.-L. Zhao**, L. Adhikari, and D. Telloni, Spectral anisotropy in 2D plus slab magnetohydrodynamic turbulence in the solar wind and upper corona, *Astrophys. J.*, under review, 2020.

[16] G. P. Zank, M. Nakanotani, **L.-L. Zhao**, L. Adhikari, and J. Kasper, The origin of switchbacks in the solar corona: linear theory, *Astrophys. J.*, under review, 2020.

[17] L. Adhikari, G. P. Zank, and **L.-L. Zhao**, A solar coronal hole and fast solar wind turbulence model and first orbit Parker Solar Probe (PSP) observations, *Astrophys. J.*, under review, 2020.

[18] F. Carbone, D. Telloni, L. Sorriso-Valvo, G. P. Zank, **L.-L. Zhao**, L. Adhikari, and R. Bruno, Statistical analysis of field-aligned Alfvénic turbulence and inermittency in fast solar wind, *MDPI*, under review, 2020.

[19] Y. Chen, Q. Hu, **L.-L. Zhao**, et al., Small-scale Magnetic Flux Ropes in the First two Parker Solar Probe Encounters, *Astrophys. J.*, under review, 2020.

[20] D. Telloni, R. D'Amicis, R. Bruno, F. Carbone, D. Perrone, G. P. Zank, **L.-L. Zhao**, M. Nakanotani, and L. Adhikari, Detection capability of flux ropes during the solar orbiter mission, *Astrophys. J.*, under review, 2020.

[21] L. Adhikari, G. P. Zank, **L.-L. Zhao**, and G. M. Webb, Evolution of Entropy and Mediation of the Solar Wind by Turbulence, *Astrophys. J.*, 891, 34, doi:10.3847/1538-4357/ab7010, 2020.

[22] L. Adhikari, G. P. Zank, **L.-L. Zhao**, J. C. Kasper, K. E. Korreck, M. Stevens, A. W. Case, P. Whittlesey, and K. G. Klein, Turbulence Transport Modeling and First Orbit Parker Solar Probe (PSP) Observations, *Astrophy. J. Supplement*, 246, 38, doi:10.3847/1538-4365/ab5852, 2020.

[23] L. Adhikari, G. P. Zank, **L.-L. Zhao**, Does Turbulence Turn off at the Alfvén Critical Surface?, *Astrophys. J.*, 876, 26, doi:10.3487/1538-4357/ab141c, 2019.

[24] L. Adhikari, O. Khabarova, G. P. Zank, **L.-L. Zhao**, The Role of Magnetic Reconnection-associated Processes in Local Particle Acceleration in the Solar Wind, *Astrophys. J.*, 873, 72, doi:10.3847/1538-4357/ab05c6, 2019.

[25] J. A. Le Roux, G. M. Webb, O. V. Khabarova, **L.-L. Zhao**, and L. Adhikari, Modeling Energetic Particle Acceleration and Transport in a Solar Wind Region with Contracting and Reconnecting Small-scale Flux Ropes at Earth Orbit, *Astrophys. J.*, 887, 77, doi:10.3847/1538-4357/ab521f, 2019.

[26] L. Yan, J. Gao, L. Chai, **L.-L. Zhao**, Z. Rong, and Y. Wei, Revisiting the Strongest Martian X-ray Halo Observed by XMM-Newton on 2003 November 19-21, *Astrophys. J. Lett.*, 883, L38, doi:10.3847/2041-8213/ab40c8, 2019.

[27] G. P. Zank, L. Adhikari, **L.-L. Zhao**, P. Mostafavi, E. J. Zirnstein, and D. J. McComas, The Pickup Ion Mediated Solar Wind, *Astrophys. J.*, 869, 23, doi:10.3847/1538-4357/aaebfe, 2018.

[28] J. Cui, R. V. Yelle, **L.-L. Zhao**, S. Stone, F. Y. Jiang, Y. T. Cao, M. J. Yao, T. T. Koskinen, and Y. Wei, The Impact of Crustal Magnetic Fields on the Thermal Structure of the Martian Upper Atmosphere, *Astrophys. J. Lett.*, 853, L33, doi:10.3847/2041-8213/aaa89a, 2018.

[29] G. Qin, **L.-L. Zhao**, and H.-C. Chen, Despiking of spacecraft energetic proton flux to study galactic cosmic-ray modulation, *Astrophys. J.*, 752, 138, doi:10.1088/0004-637X/752/2/138, 2012.

## *Conference Papers*

[1] **L.-L. Zhao**, G. P. Zank, L. Adhikari, Q. Hu, and J. A. le Roux, Possible magnetic flux rope structures downstream of the heliospheric termination shock, *Journal of Physics: Conference Series*, in press, 2020.

[2] L. Adhikari, G. P. Zank, **L.-L. Zhao**, and G. M. Webb, Evolution of entropy in the outer heliosphere, *Journal of Physics: Conference Series*, in press, 2020.

[3] M. Nakanotani, G. P. Zank, and **L.-L. Zhao**, The Interaction of Current Sheets with a Shock Wave and Particle Acceleration, *Journal of Physics: Conference Series*, in press, 2020.

[4] J. A. le Roux, G. M. Webb, O. V. Khabarova, K. T. Van Eck, **L.-L. Zhao**, and L. Adhikari, Investigating 1st and 2nd order Fermi acceleration of energetic particles by small-scale flux ropes at 1AU, *Journal of Physics: Conference Series*, in press, 2020.

[5] **L.-L. Zhao**, G. P. Zank, and L. Adhikari, A possible explanation for the enhancement of energetic particles downstream of the heliospheric termination shock, *Journal of Physics: Conference Series*, 1332, 012020, doi:10.1088/1742-6596/1332/1/012020, 2019.

[6] L. Adhikari, G. P. Zank, and **L.-L. Zhao**, A Nearly Incompressible Turbulence-Driven Solar Wind Model, *Journal of Physics: Conference Series*, 1332, 012001, doi:10.1088/1742-6596/1332/1/012001, 2019.

[7] **L.-L. Zhao**, L. Adhikari, G. P. Zank, Q. Hu, and X. S. Feng, Analytical investigation of turbulence quantities and cosmic ray mean free paths from 1995-2017, *Journal of Physics: Conference Series*, 1100, 012029, doi:10.1088/1742-6596/1100/1/012029, 2018.

[8] L. Adhikari, G. P. Zank, **L.-L. Zhao**, D. Telloni, P. Hunana, R. Bruno, and D. Shiota, Evolution of Power Anisotropy in Magnetic Field Fluctuations at Different Solar Activity Levels, *Journal of Physics: Conference Series*, 1100, 012001, doi:10.1088/1742-6596/1100/1/012001, 2018.

[9] G. Qin and **L.-L. Zhao**, Study of Different Solar Cycle Variations of Solar Energetic Particles and Cosmic Rays by Despiking ACE/SIS Heavy-Ion Fluxes, arxiv:1312.2296, 2013.