Kristopher G. Klein: Curriculum Vitae

Department of Planetary Sciences, University of Arizona
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Education

University of Iowa — **Iowa City, IA**
Doctor of Philosophy in Physics; *Advisor*: G.G. Howes — Dec. 2013
The Kinetic Plasma Physics of Solar Wind Turbulence — 10.5281/zenodo.50471
Committee: F. Skiff, C. Kletzing, S. Spangler, A. Ratner

Luther College — **Decorah, IA**
Bachelor of Arts in Physics and Mathematics; Magna Cum Laude — May 2008
Advisor: Todd Pedlar; Departmental Honors

Employment

University of Arizona — **Tucson, AZ**
Associate Professor, Dept. Planetary Sciences & LPL — 2023-present
Assistant Professor, Dept. Planetary Sciences & LPL — 2018-2023

University of Michigan — **Ann Arbor, MI**
Postdoctoral Research Scholar, CLASP — 2016-2018

University of New Hampshire — **Durham, NH**
NSF AGS Postdoctoral Researcher, Space Science Center — 2014-2016

University of Iowa — **Iowa City, IA**
Postdoctoral Researcher, Dept. Physics & Astronomy — 2014

Honors and Awards

University of Arizona Distinguished Scholar Award — 2025
American Astronomical Society Solar Physics Division Karen Harvey Prize — 2024
Collier Trophy for Greatest Achievement in Aeronautics or Astronautics (Parker Solar Probe Mission Team) — 2024
American Physical Society Division of Plasma Physics Lev D. Landau and Lyman Spitzer Jr. Award for Outstanding Contributions to Plasma Physics — 2022
NASA Silver Achievement Medal (Parker Solar Probe Team) — 2019
NASA Early Career Investigator Program Award — 2019
National Academy of Science New Leaders in Space Physics — 2016
National Science Foundation AGS Postdoctoral Research Fellow — 2014
University of Iowa Goertz/Nicholson Memorial Scholarship — 2012
Phi Beta Kappa - National Honor Society — 2008
Pi Mu Epsilon - National Mathematics Honor Society — 2007
Sigma Pi Sigma - National Physics Honor Society — 2006

Service

Government Service

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION:
- Review Panelist - 2014, 2019, 2020, 2021, 2025 (Chair)
- External Reviewer - 2015, 2023, 2024

NATIONAL SCIENCE FOUNDATION:
- Review Panelist - 2014, 2017, 2020, 2021, 2026;
- External Reviewer - 2016, 2019, 2024, 2025

DEPARTMENT OF ENERGY: External Reviewer - 2020, 2024, 2025
UNITED KINGDOM RESEARCH COUNCIL: External Reviewer - 2021
DEUTSCHE FORSCHUNGSGEMEINSCHAF: External Reviewer - 2025
AGENCE NATIONALE DE LA RECHERCHE: External Reviewer - 2025

Professional Service
American Physical Society Topical Group of Plasma Astrophysics:
Executive Committee Member-at-Large: 2018-2021
Treasurer: 2021-2027
SHINE Steering Committee: 2023-2025
Parker Solar Probe Science Working Group Lead Organizer: Fall 2022-

Summer School Lecturer
NSF/APS-DPP GPAP Summer School on Plasma Astrophysics: 2019, 2021, 2026
Simons Collaboration on Extreme Electrodynamics of Compact Sources Summer School: 2025, 2026
The heliospheric space plasma physics in the era of multipoint space missions: 2026

Workshop and Conference Organization
Excitation and Dissipation of Kinetic-Scale Fluctuations in Space Plasmas: ISSI Team Leader (2025-2026)
Electron Kinetic Physics: The Next Frontier in Space and Astrophysical Plasmas
ISSI Workshop Organizing Committee (2024)
Program Committee, American Physical Society Division of Plasma Physics (2023)
Parker Two Conference Science Organizing Committee (Spring 2022)
Parker Solar Probe Science Working Group Local Organizing Committee (Fall 2022)
SHINE Workshop Session Organizer (2015-2019,2022)
COSPAR Session Organizing Committee: PSP Session (2022)
American Geophysical Union Fall Meeting Session Organizer (2017, 2019)
American Physical Society, Division of Plasma Physics Mini-conference Organizer (2017)

Professional Membership
American Astronomical Society, Division of Solar Physics (2018-present)
American Geophysical Union, (2013-present)
American Physical Society, Division of Plasma Physics (2010-present)

Journal Referee[50], *including* Nature Physics, Nature Communications,
Journal of Plasma of Physics, Physics of Plasmas, Physical Review Letters,
Journal of Geophysical Research, The Astrophysical Journal Letter,
The Astrophysical Journal, Annales Geophysicae, Frontiers: Space Sciences, Space Science Reviews

University Service
Steward Observatory Faculty Search Committee: Spring 2023

Departmental Service
Lunar and Planetary Laboratory & Department of Planetary Sciences, U. Arizona:
Theoretical Astrophysics Program Steering Committee: 2018-2023, 2025-
Theoretical Astrophysics Program Colloquium Committee: 2019-2022
Graduate Advising and Admissions Committee:
Member: 2018-2021, Chair: 2021-2022, 2024-2025)
Journal Club Advisor: 2018-2019

Outreach

Public Seminars [8]
HelioSwarm: The Nature of Turbulence in Space Sonora Astronomical Society, March 2023
HelioSwarm: A Mission to Better Understand Space Plasmas Tucson Amateur Astronomy Association, Jan. 2023
*Our First Encounters with the Sun: What we are learning from NASA's Parker Solar Probe*Ray Society, March 2021
Our First Encounters with the Sun:NASA's Parker Solar Probe Old Pueblo Business Alliance, June 2020
Our First Trip to the Sun: What we are learning from NASA's Parker Solar Probe Saddlebrooke SkyGazers Club, 2019
A Mission to Touch the Sun: NASA's Parker Solar Probe 49^{th} Smithsonian Lecture Series, Feb. 2019
Traveling to the Sun: What we are learning from NASA's Parker Solar Probe Tucson Graduate Club, Dec. 2018
Visiting our Sun: Unraveling the Mysteries of the Solar Atmosphere using PSP LPL Evening Seminar, Sept. 2018

Mentoring

Dissertation Committees

David Ball (UArizona, Astronomy; PhD: 2020)
Dan McGinnis (UIowa, Physics & Astronomy; Comps: 2020, PhD: 2021)
Tracy Esman (UArizona, Planetary; PhD: 2022)
Sarah Horvath (UIowa, Physics & Astronomy; Comps: 2021, PhD: 2023)
Xiaohuang Chen (UArizona, Planetary; PhD: Fall 2023)
Teddy Broeren (Chair, Applied Mathematics; UArizona, PhD: Spring 2024)
Kaushik Satapathy (UArizona, Astronomy; PhD: Summer 2024)
Jada Walters (Chair, Planetary; UArizona, PhD: Fall 2024)
Niranjana Shankarappa (Chair, UArizona, Physics; Expected Defense Spring 2026)
Waverly Gorman (Chair; UArizona, Physics; Expected Defense Spring 2026)
Ningyuan Xu (UArizona, Astronomy; Expected Defense Spring 2028)

GRADUATE STUDENT SUPERVISION

Teddy Broeren (Spring 2024, now Senior R&D Engineer at Raytheon Technologies)
Jada Walters (Fall 2024, now Software Analyst)

POSTDOCTORAL SUPERVISION

Mihailo Martinovic (2018-2022, now Research Faculty at UArizona)
Emily Lichko (NSF AGS Postdoctoral Research Fellow 2020-2022, now Researcher at Naval Research Laboratory)

Publications

PEER REVIEWED JOURNAL ARTICLES

[140 Articles; h-index: 43, i10-index: 93, i100-index: 17, citations: 6118][1,2,3]

[140]Zheng, X. et al. (3rd of 14 authors) *EFirst in Situ Estimates of the Sheath Resistance for the PSP/FIELD Antenna: Employing an Electron Shot Noise Model* ApJ, **997**, 137, 2026, doi: 10.3847/1538-4357/ae25e6

[139]Zheng, X. et al. (3rd of 11 authors) *Electrostatic Thermal Noise in Magnetized Weakly Ionized Collisional Plasmas* JGR, **131**, 121 2025JA034176, 2026, doi: 10.1029/2025JA034176

[138]Yoon, P. et al. (5th of 11 authors) *Regulation of temperature anisotropy for solar wind protons and alpha particles by collisions and instabilities*, A&A, **795**, A14, 2026, doi: 0.1051/0004-6361/202557070

[137]Bowen, T. et al. (9th of 10 authors) *Stochastic Heating in the Sub-Alfvénic Solar Wind*, PRL, **135**, 255201, 2025, doi: 10.1103/rxd8-22m9 **Citations: 2**

[136]Badman, S. T., et al. (5th of 21 authors) *Multispacecraft Measurements of the Evolving Geometry of the Solar Alfvén Surface over Half a Solar Cycle*, ApJL **995**, L37, 2025 doi: 10.3847/2041-8213/ae0e5c **Citations: 4**

[135]Richard, L, et al. (5th of 9 authors) *Non-Maxwellianity of ion velocity distributions in the Earth's magnetosheath*, PRE **112**, L053201, 2025 doi: 10.1103/7p1x-84y9 **Citations: 2**

[134]Guo, X, Zhao, J., **Klein, K.G.**, and Xie, H. *Free Energy Source of the Mirror Instability: Nonresonant Particles*, PRL **135**, 185201, 2025 doi: 10.1103/x12v-h3xq

[133]**Klein, K. G.** and Verscharen, D. *The Dielectric Response of Plasmas with Arbitrary Gyrotropic Velocity Distributions*, PoP **32**, 9, 2025 doi: 10.1063/5.0286477 **Citations: 2**

[132]Rivera, Y. J., **Klein, K. G.** et al. (18 authors) *Observational Constraints on the Radial Evolution of O^{6+} Temperature and Differential Flow in the Inner Heliosphere*, ApJ **990**, L60, 2025 doi: 10.3847/2041-8213/adfa97 **Citations: 1**

[131]Zhang, J. et al. (5th of 5 authors) *Parker Solar Probe Observations of Turbulence and Waves between a Current Sheet and an Interplanetary Coronal Mass Ejection–Driven Shock*, ApJ **990**, 73, 2025 doi: 110.3847/1538-4357/adf55b

[130]Chandran, B.D.G. et al. (6th of 11 authors) *A Two-Fluid Solar-Wind Model with Intermittent Alfvénic Turbulence*, J. Plasma Phys. **91**, E125, 2025 doi: 10.1017/S0022377825100640

[129]Sadykov, V. M. et al. (7th of 8 authors) *Identification of Ion-Kinetic Instabilities in Hybrid-PIC Simulations of Solar Wind Plasma with Machine Learning* ApJS, **279**, 28, 2025, doi: 10.3847/1538-4365/addd07 **Citations: 3**

[1] As of January 26, 2026 from SAO/NASA ADS: http://adsabs.harvard.edu/abstract_service.html
[2] ORCID ID: 0000-0001-6038-1923
[3] ◦Postdoctoral mentee or graduate student advisee. *Work done as a graduate student.

[128]Martinovic, M. M., **Klein, K.G.** (6 authors) *Impact of Two-population α-particle Distributions on Plasma Stability* ApJL, **988**, L25, 2025, doi: 10.3847/2041-8213/adeaac **Citations: 6**
[127]Yogesh et al. (4^{th} of 12 authors) *Evidence of Interaction between Ion-Scale Waves and Ion Velocity Distributions in the Solar Wind* ApJ, **986**, 119, 2025, doi: 10.3847/1538-4357/add467 **Citations: 6**
[126]Zheng, X. et al. (3^{rd} of 10 authors) *Quasi-thermal Noise in Magnetized Plasma: Theory and Simulations* ApJ, **985**, 114, 2025, doi: 10.3847/1538-4357/add00f
[125]Bowen, T. et al. (9^{th} of 13 authors) *Nonlinear Interactions in Spherically Polarized Alfvénic Turbulence* ApJ, **985**, 49, 2025, doi: 10.3847/1538-4357/adc569 **Citations: 8**
[124]Schröder, D.L., et al. (5^{th} of 5 authors) *Temperature anisotropy instabilities of solar wind electrons with regularized kappa-halos resolved with ALPS* PoP, **32**, 032109, 2025, doi: 10.1063/5.0254526 **Citations: 4**
[123]Zhang, M. et al. (4^{th} of 4 authors) *Extreme Heating of Minor Ions in Imbalanced Solar-wind Turbulence* ApJ, **979**, 121 e2024GL112038, 2025, doi: 10.3847/1538-4357/ad95fc **Citations: 8**
[122]Ofman, L. et al. (7^{th} of 8 authors) *Modeling Hot, Anisotropic Ion Beams in the Solar Wind Motivated by the Parker Solar Probe Observations Near Perihelia* ApJ, **984**, 1274, 2025, doi: 10.3847/1538-4357/adc812 **Citations: 6**
[121]**Klein, K.G** et. al. (4 authors) *Wave-Telescope Analysis for Multipoint Observatories: Impact of Timing and Spatial Uncertainties* JGR, 129, e2024JA033428, 2024, doi: 10.1029/2024JA033428
[120]Lewis, H. et al. (5^{th} of 9 authors) *Turbulent Energy Conversion Associated With Kinetic Microinstabilities in Earth's Magnetosheath* GRL, **51**, e2024GL112038, 2024, doi: 10.1029/2024GL112038 **Citations: 4**
[119]Zheng, X. et. al. (4^{th} of 10 authors) *Radial Evolution of Non-Maxwellian Electron Populations Derived from Quasi-thermal Noise Spectroscopy: Parker Solar Probe Observations* ApJ, **977** 39, 2024, doi: 10.3847/1538-4357/ad7d05 **Citations: 3**
[118]Roberts, O.W. **Klein, K.G** et al. (9 authors) *Measurement of the Taylor Microscale and the Effective Magnetic Reynolds Number in the Solar Wind With Cluster* JGR, **129** 11, 2024, doi: 10.1029/2024JA032968 **Citations: 1**
[117]Walters, J.$^\circ$, **Klein, K.G.** et al. (5 authors) *Electron Influence on the Parallel Proton Firehose Instability in 10-moment, Multifluid Simulations* ApJ, **975** 290, 2024, doi: 10.3847/1538-4357/ad7c47 **Citations: 3**
[116]Yoon, P.H. et al., (3^{rd} of 9 authors) *Regulation of solar wind electron temperature anisotropy by collisions and instabilities* ApJ, **975** 105, 2024 doi: 10.3847/1538-4357/ad7b09 **Citations: 3**
[115]Afshari, A.S. et al., (4^{th} of 11 authors) *Direct observation of ion cyclotron damping of turbulence in Earth's magnetosheath plasma* Nat. Comm., **15** 7870, 2024 doi: 10.1038/s41467-024-52125-8 **Citations: 7**
[114]Shankarappa, N.$^\circ$, **Klein, K.G.**, et al. (4 authors), *Estimated Heating Rates Due to Cyclotron Damping of Ion-scale Waves Observed by Parker Solar Probe* ApJ, **973** 20, 2024 doi: 10.3847/1538-4357/ad5f2a **Citations: 13**
[113]Pecora, F. et al., (4^{th} of 7 authors) *Evaluation of Scale-dependent Kurtosis with HelioSwarm* ApJ, **970** L36, 2024 doi: 10.3847/2041-8213/ad5fff **Citations: 1**
[112]Yoon, P.H. et al., (6^{th} of 7 authors) *Boundary of the Distribution of Solar Wind Proton Beta versus Temperature Anisotropy* ApJ, **969** 77, 2024 doi: 10.3847/1538-4357/ad47f1 **Citations: 7**
[111]Gorman, W.$^\circ$ and **Klein, K.G.**, *Mind the Gap: Nonlocal Cascades and Preferential Heating in High-β Alfvénic Turbulence* MNRAS, **531** 1, 2024 doi: 10.1093/mnrasl/slae018 **Citations: 3**
[110]Chen, X. et al. (4^{th} of 4 authors), *Parallel Diffusion Coefficient of Energetic Charged Particles in the Inner Heliosphere from the Turbulent Magnetic Fields Measured by Parker Solar Probe* ApJ, **965** 61, 2024 doi: 10.3847/1538-4357/ad33c3 **Citations: 10**
[109]Broeren, T.$^\circ$, **Klein, K.G.**, and TenBarge, J.M. *Multi-Spacecraft Magnetic Field Reconstructions: A Cross-Scale Comparison of Methods* Earth and Space Science, **11** 3, 2024 doi: 10.1029/2023EA003369 **Citations: 3**
[108]Holmes, J. et al. (3^{rd} of 5 authors), *Zone of Preferential Heating for Minor Ions in the Solar Wind* ApJ, **964** 19, 2024 doi: 10.3847/1538-4357/ad23ea **Citations: 2**
[107]Johnson, E. et al. (5^{th} of 6 authors) *Application of Collisional Analysis to the Differential Velocity of Solar Wind Ions* FrASS, **10**, 2024, doi: 10.3389/fspas.2023.1284913 **Citations: 5**
[106]McManus, M, **Klein, K.G.** et al. (11 authors) *Proton- and Alpha-driven Instabilities in an Ion Cyclotron Wave Event* ApJ, **961** 142, 2024, doi: 10.3847/1538-4357/ad05ba **Citations: 20**
[105]Jiang, W. et al. (5^{th} of 7 authors) *Velocity-space Signatures of Resonant Energy Transfer between Whistler Waves and Electrons in the Earth's Magnetosheath* ApJ, **960** 30, 2024, doi: 10.3847/1538-4357/ad0df8 **Citations: 10**
[104]**Klein, K.G.** et al. (50 authors) *HelioSwarm: A Multipoint, Multiscale Mission to Characterize Turbulence* SSR, **219** 74 doi: 10.1007/s11214-023-01019-0 **Citations: 49**
[103]Pecora, F. et al. (5^{th} of 11 authors) *Three-Dimensional Energy Transfer in Space Plasma Turbulence from Multipoint Measurement* PRL, **131** 225201, 2023, doi: 10.1103/PhysRevLett.131.225201 **Citations: 12**

[102]Giacalone, F. et al. (7^{th} of 21 authors) *Analyses of ∼0.05–2 MeV Ions Associated with the 2022 February 16 Energetic Storm Particle Event Observed by Parker Solar Probe* ApJ, **958** 144, 2023, doi: 10.3847/1538-4357/acfb86 **Citations: 17**
[101]Walters, J.°, **Klein, K.G.** et al. (6 authors) *The Effects of Nonequilibrium Velocity Distributions on Alfvén Ion-cyclotron Waves in the Solar Wind* ApJ, **955** 97, 2023, doi: 10.3847/1538-4357/acf1fa **Citations: 15**
[100]Romero, O. et al. (13^{th} of 23 authors) *Near-Sun In Situ and Remote-sensing Observations of a Coronal Mass Ejection and its Effect on the Heliospheric Current Sheet* ApJ, **954** 168, 2023, doi: 10.3847/1538-4357/ace62e **Citations: 42**
[99]Lewis, H. et al. (5^{th} of 11 authors) *Magnetospheric Multiscale Measurements of Turbulent Electric Fields in Earth's Magnetosheath: How do Plasma Conditions Influence the Balance of Terms in Generalized Ohm's Law?* PoP, **30**, 082901, 2023, doi: 10.1063/5.0158067 **Citations: 5**
[98]Roberts, O.W. et al. (10^{th} of 14 authors) *Estimation of the Error in the Calculation of the Pressure-Strain Term: Application in the Terrestrial Magnetosphere* JGR, **128** 8, 2023, doi: 10.1029/2023JA031565 **Citations: 8**
[97]Huang, J. et al. (8^{th} of 28 authors) *The Structure and Origin of Switchbacks: Parker Solar Probe Observations* ApJ, **952** 33, 2023, doi:10.3847/1538-4357/acd17e **Citations: 22**
[96]Halekas, J. et al. (7^{th} of 15 authors) *Quantifying the Energy Budget for Solar Wind Acceleration from 13.3-100 Solar Radii* ApJ, **952** 26, 2023, doi: 10.3847/1538-4357/acd769 **Citations: 29**
[95]Martinović, M. & **Klein, K.G.** *Ion-Driven Instabilities in the Inner Heliosphere II: Classification and Multi-Dimensional Mapping* ApJ, **952** 14, 2023, doi: 10.3847/1538-4357/acdb79 **Citations: 11**
[94]Johnson, E. et al. (4^{th} of 17 authors) *Anterograde Collisional Analysis of Solar Wind Ions* ApJ, **950** 51, 2023, doi: 10.3847/1538-4357/accc32 **Citations: 5**
[93]Broeren, T.° & **Klein, K.G.** *Data-Driven Uncertainty Quantification of the Wave-Telescope Technique: General Equations and Demonstration using HelioSwarm* ApJS, **266** 12, 2023 doi: 10.3847/1538-4365/acc6c7 **Citations: 7**
[92]Huang, J. et al. (9^{th} of 26 authors) *Parker Solar Probe Observations of High Plasma β Solar Wind from the Streamer Belt* ApJS, **265** 47, 2023, doi: 10.3847/1538-4365/acbcd2 **Citations: 12**
[91]Shankarappa, N°, **Klein, K. G.**, & Martinović, M.M., *Estimation of turbulence proton and electron heating rates via Landau damping constrained by Parker Solar Probe observations* ApJ, **946** 85, 2023, doi: 10.3847/1538-4357/acb542 **Citations: 14**
[90]Raouafi, N.E., et al., (6^{th} of 57 authors), *Parker Solar Probe: Four Years of Discoveries at Solar Cycle Minimum* SSRv, **219** 8, 2023, doi: 10.1007/s11214-023-00952-4 **Citations: 120**
[89]Juno, J, et al. (8^{th} of 8 authors) *Phase-space Energization of Ions in Oblique Shocks* ApJ **944** 15, 2023 doi: 10.3847/1538-4357/acaf53 **Citations: 7**
[88]Verscharen, D. et al. (15^{th} of 27 authors) *A Case for Electron-Astrophysics* Experimental Astronomy 2021 doi:10.1007/s10686-021-09761-5 **Citations: 15**
[87]Bowen, T. S. et al., (6^{th} of 12 authors), *In Situ Signature of Cyclotron Resonant Heating in the Solar Wind* PRL, **129** 16, 2022, doi: 10.1103/PhysRevLett.129.165101 **Citations: 53**
[86]Livi, R. et al., (6^{th} of 22 authors), *The Solar Probe ANalyzer-Ions on the Parker Solar Probe* ApJ, **938** 2, 2022, doi: 10.3847/1538-4357/ac93f5 **Citations: 126**
[85]Jiang, W., et al. (5^{th} of 5 authors), *Whistler Waves as a Signature of Converging Magnetic Holes in Space Plasmas* ApJ, **935**, 169, 2022 doi: 10.3847/1538-4357/ac7ce2 **Citations: 13**
[84]Shi, C., et al. (10^{th} of 21 authors), *Patches of Magnetic Switchbacks and Their Origins* ApJ, **934**, 152, 2022 doi: 10.3847/1538-4357/ac7c11 **Citations: 27**
[83]Howes, G. G., et al. (7^{th} of 14 authors), *Revolutionizing our Understanding of Particle Energization in Space Plasmas Using On-Board Wave-Particle Correlator Instrumentation* FrASS, **9**, 912868, 2022 doi: 10.3389/fspas.2022.912868 **Citations: 1**
[82]Martinović, M. M.°, Antonije R. Dordević, **Klein, K. G.,** et al. (10 authors) *Plasma Parameters from Quasi-Thermal Noise Observed by Parker Solar Probe: A New Model for the Antenna Response* JGR, 127, e2021JA030182. 2022 doi: 10.1029/2021JA030182 **Citations: 9**
[81]Verniero, J, et al. (12^{th} of 19 authors), *Strong perpendicular velocity-space in proton beams observed by Parker Solar Probe* ApJ, **924**, 112, 2022 doi: 10.3847/1538-4357/ac36d5 **Citations: 41**
[80]Kasper, J. C., **Klein, K.G.** et al., (28 authors), *Parker Solar Probe Enters the Magnetically Dominated Solar Corona*, PRL, **127**, 255101, 2021, doi: 10.1103/PhysRevLett.127.255101 **Citations: 170**
[79]Martinović, M. M.°, **Klein, K. G.,** Durovcova, T., Alterman, B., *Ion-Driven Instabilities in the Inner Heliosphere I: Statistical Trends* ApJ, **923**, 116, 2021 doi: 10.3847/1538-4357/ac3081 **Citations: 17**

[78]Esman, T. M., Espley, J., Gruesbeck, J, **Klein, K. G.**, & Giacalone, J., *Plasma Waves Far Upstream of the Martian Bow Shock* JGR, **126**, 11, e29686, 2021 doi: 10.1029/2021JA029686 **Citations: 2**
[77]Vech, D. et al. (6$^{\text{th}}$ of 8 authors) *Experimental determination of ion acoustic wave dispersion relation with interferometric analysis* JGR, **126**, 11, e29221, 2021 doi:10.1029/2021JA029221 **Citations: 6**
[76]Broeren, T.$^{\circ}$, **Klein, K. G.,** et al (6 authors), *Magnetic Field Reconstruction for a Realistic Multi-Point, Multi-Scale Spacecraft Observatory* FrASS, **8**, 144B, 2021 doi: 10.3389/fspas.2021.727076 **Citations: 10**
[75]Juno, J, et al. (7$^{\text{th}}$ of 8 authors) *A field–particle correlation analysis of a perpendicular magnetized collisionless shock* J. Plasma Physics. **87** 905870316, 2021 doi:10.1017/S0022377821000623 **Citations: 15**
[74]Chen, C.H.K. et al. (8^{th} of 11 authors) *The near-Sun streamer belt solar wind: turbulence and solar wind acceleration* A&A **650**, L3, 2021 doi:10.1051/0004-6361/202039872 **Citations: 31**
[73]Vech, D. et al. (6^{th} of 7 authors) *A powerful machine learning technique to extract proton core, beam, and alpha-particle parameters from velocity distribution functions in space plasmas* A&A **650**, A198, 2021 doi:10.1051/0004-6361/202141063 **Citations: 4**
[72]Halekas et al. (10^{th} of 18 authors) *Electron Heat Flux in the near-Sun environment* A&A **650**, A15, 2021 doi:10.1051/0004-6361/202039256 **Citations: 40**
[71]Zhao, L. L. et al. (24^{th} of 25 authors) *Detection of small magnetic flux ropes from the third and fourth Parker Solar Probe encounters* A&A **650**, A12, 2021 doi:10.1051/0004-6361/202039298 **Citations: 54**
[70]Vech, D., Martinović, M.M.$^{\circ}$, **Klein, K.G.**, et al. (24 authors) *Wave-particle energy transfer directly observed in an ion cyclotron wave* A&A **650**, A10, 2021 doi:10.1051/0004-6361/202039296 **Citations: 21**
[69]Verniero, J, Howes, G. G., Stewart, D. E., & **Klein, K. G.**, *PATCH: Particle Arrival Time Correlation for Heliophysics* JGR, 2021 doi: 10.1029/2020JA028940 **Citations: 4**
[68]Verniero, J, Howes, G. G., Stewart, D. E., & **Klein, K. G.**, *Determining Threshold Instrumental Resolutions for Resolving the Velocity-Space Signature of Ion Landau Damping* JGR, 2021 doi: 10.1029/2020JA028361 **Citations: 7**
[67]Martinović, M. M.$^{\circ}$, **Klein, K. G.** et al. (12 authors) *Multiscale Solar Wind Turbulence Properties inside and near Switchbacks Measured by the Parker Solar Probe* ApJ **912**, 28, 2021 doi: 10.3847/1538-4357/abebe5 **Citations: 32**
[66]Perez, J. C., Chandran. B. D. G., **Klein, K. G.**, & Martinović, M. M.$^{\circ}$ *How Alfvén waves energize the solar wind: heat versus work* J. Plasma Phys. **87**, 905870218, 2021
doi: 10.1017/S0022377821000167 **Citations: 8**
[65]**Klein, K. G.** et al. (15 authors) *Inferred Linear Stability of Parker Solar Probe Observations Using One- and Two-component Proton Distributions* ApJ **909**, 7, 2021 doi: 10.3847/1538-4357/abd7a0 **Citations: 47**
[64]Beatty, C.B et al(5$^{\text{th}}$ of 8 authors) *Creation of large temperature anisotropies in a laboratory plasma*, PoP **27**, 122101, 2020 doi: 10.1063/5.0029315 **Citations: 9**
[63]Bourouaine, S., Perez, J.C., **Klein, K. G.**, et al (8 authors) *Turbulence Characteristics of Switchback and Non-switchback Intervals Observed by Parker Solar Probe*, ApJL. **904**, L30, 2020 doi: 10.3847/2041-8213/abbd4a
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TECHNICAL REPORTS [12]

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Other Scholarship

CURRICULA

Principles of Planetary Physics (PTYS 505A)

An introductory graduate course onthe physics of planetary and interplanetary gases, fluids, and plasmas. Specific topics include thermodynamics, kinetic theory, plasma physics, hydrodynamics, and magnetohydrodynamics, all with solar-system applications.

Introduction to Plasma Physics (PTYS 414/514)

An upper-level undergraduate/beginning graduate course on basic plasma physics processes, including single particle motion, magnetohydrodynamic and fluid models, linear waves, kinetic theory, plasma stability, and magnetic reconnection.

The Physics of the Sun (PTYS 537)

A graduate course on solar magnetic fields, solar interior and helioseismology, radiative transfer, solar-energetic particles, the structure of the solar atmosphere and stellar winds, and the physics of sunspots and flares.

Exploring Our Solar System (PTYS 206)

A undergraduate general education course surveying how and why we have explored our solar system, as well as the current search of life beyond Earth within our solar system and in exoplanetary systems.

Earth: The Formation of a Habitable World (PTYS 170A1)

A undergraduate general education course developing a planetary science perspective on the physical, chemical, and geological processes that governed the formation of our planet and continue to drive its evolution.

COMPUTER PROGRAMS

Plasma in a Uniform Magnetized Environment (`PLUME`; FORTRAN)

A numerical linear Vlasov-Maxwell dispersion solver for a collisionless plasma with an arbitrary number of Bi-Maxwellian ion and electron velocity distributions, with distinct densities, drift velocities, and anisotropic temperatures. `PLUME` returns the complex frequency solution to the dispersion relation as well as the electromagnetic and fluid eigenfunctions, and allows for an arbitrary scan through the any of the underlying plasma parameters, c.f. Klein & Howes 2015 PoP [8] and used in [28,32,35,70]. This code is used as the core of the numerical Nyquist instability solver, described in Klein et al. 2017 JGR [17], and used in [24,37,56,64,65,80] Available as an open source code on github.

Arbitrary Linear Plasma Solver (`ALPS`; FORTRAN; doi: 10.5281/zenodo.8075681)

A numerical linear Vlasov-Maxwell dispersion solver for a collisionless plasma that allows for an arbitrary gyrotropic distribution of ions and electrons in momentum space. `ALPS` returns the complex frequency solution to the dispersion relation in both the relativistic and non-relativistic limits and allows for an arbitrary scan of the solutions as a function of wavevector. c.f. Verscharen, Klein, et al 2018 JPP [27] and used in [57]. Available as an open source code on github.

Media

Parker Solar Probe Launch (Fall 2018)

Provided expert interviews for press coverage of Parker Solar Probe launch. Quoted in a number of local, domestic, and international articles, including on **CNN** and **CNET**.

Predictions for Crossing the Alfvén Surface (Summer 2019, Winter 2021)

Provided expert interviews for prediction of 'region of preferential heating' below the Alfvén surface in advance of PSP entering this region, associated with publication of **Kasper** & Klein 2019 ApJL. Quoted in various domestic and international articles, including **Science Daily** and **NASAspaceflight.com**. Provided additional interviews when PSP crossed this surface, e.g. an article in **Futurity**, coinciding with publication of **Kasper**, Klein, et al 2021 PRL.

Parker Solar Probe First Results (Winter 2019)

Quoted in online articles, e.g. this article from **Futurity**, coinciding with the release of the first light papers from PSP published in Nature in Winter 2019.

HelioSwarm Selection (Spring 2022)

Provided interviews to coincide with announcement of NASA selection of HelioSwarm mission, used in local **online** and **radio** articles.

Conferences / Scholarly Present.

INVITED CONFERENCE PRESENTATIONS [33]

Instability and Excitation in the Heliosphere: Theory and Observation Asia Oceania Geoscience Society, July 2025

A New Era of Multi-spacecraft Measurements: Novel multipoint & multiscale techniques
SHINE Workshop, June 2025

Clarifying the Role of Kinetic Plasma Process in the Inner Heliosphere AGU Fall Meeting, Dec 2024

Towards a new era of Space Plasma Physics Plasma Observatory Workshop, Rome, IT, Nov 2024

Traversing the Slopes of Phase Space: Linear Dispersion Relations from Plasma Peaks to Gravitational Valleys
KITP Interconnections between Physics of Plasmas and Self-gravitating Systems, June 2024

Dissipation and Excitation: The Role of Kinetic-Scale Waves and Instabilities in the Evolution of the Solar Wind
AAS 244, June 2024

Karen Harvey Prize Lecture: The Role of Kinetic-Scale Waves and Instabilities in the Evolution of the Solar Wind

TESS, April 2024
HelioSwarm: Characterizing the Nature of Space Plasma Turbulence
Kavli Institute for Theoretical Physics, "Turbulence in the Universe" Feb 2024
Theory of Ion instabilities, Application to PSP (and other spacecraft) data
ISSI Workshop 563 "Ion Kinetic Instabilities in the Solar Wind in Light of Parker Solar Probe and Solar Orbiter Observations", Sept 2023
What are the Basic Building Blocks of Solar Wind Turbulence? SHINE Workshop Aug 2023
Quantifying Space Plasma Turbulence with a Multi-Point, Multi-Scale Observatory
IUGG 28$^{\text{th}}$ General Assembly July 2023
An Overview of the HelioSwarm Observatory
ISSI Workshop 556 "Cross-Scale Energy Transfer in Space Plasmas" Feb 2023
Beyond Brazil: The Role of Beams and Secondary Populations in Ion-Scale Instabilities
ISSI Workshop 563 "Ion Kinetic Instabilities in the Solar Wind in Light of Parker Solar Probe and Solar Orbiter Observations", November 2022
Solar Wind Turbulence: From the Alfven Surface to 1 au
Asia Oceania Geosciences Society 19th Annual Meeting, August 2022
Kinetic Physics of Dissipation Royal Society Theo Murphy Meeting on Turbulent Dissipation in Space Plasmas, May 2022
HelioSwarm: Quantifying Turbulence with a Multi-Point, Multi-Scale Observatory AGU, Dec 2021
Tutorial: Parker Solar Probe: Advancing our Understanding of Plasmas in the Young Solar Wind APS-DPP Nov 2021
Solar Wind Turbulence from the Near-Sun Environment to Earth Association of Asia Pacific Physical Societies Division of Plasma Physics, Sept. 2021
Parker Solar Probe: Advancing Our Understanding of Plasma Processes in the Young Solar Wind MagNetUS, Aug. 2021
Alfvenic Jets, Waves, and Turbulence: Initial Results from Parker Solar Probe's first three orbits COSPAR, Jan 2021
New Plasma Physics Pushing Closer to the Sun with PSP/SWEAP AGU, Dec 2020
The Distribution of Ion-Driven Instabilities in the Inner Heliosphere
19$^{\text{th}}$ International Astrophysics Conference, March 2020
Kinetic Instabilities in Magnetized, Collisionless Plasmas
12$^{\text{th}}$ Wolfgang Pauli Plasma Kinetics Working Meeting, Aug. 2019
A Preferential Ion Heating Zone Near The Sun: What is it, Where is it, and What Drives it?
18$^{\text{th}}$ International Astrophysics Conference, Feb. 2019
Tracking Energization and Dissipation in the Near-Sun Environment with Parker Solar Probe AGU TESS, May. 2018
How Unstable is the Solar Wind? Evaluating in situ Observations using Nyquist's Criterion 17$^{\text{th}}$ International Astrophysics Conference, Mar. 2018
Using Velocity-Space Structure of Field-Particle Correlations to Characterize Energy Transfer in Space and Laboratory Plasmas IPELS, June 2017
Applying Field-Particle Correlations to Assess Turbulent Heating in the Solar Wind EGU, Apr. 2017
A General Method for Instability Identification in Solar Wind Observations Illustrated by Particular Application to WIND Measurements
16$^{\text{th}}$ International Astrophysics Conference, Mar. 2017
Identifying and Characterizing Kinetic Instabilities using Solar Wind Observations of Non-Maxwellian Plasmas
AGU, Dec. 2016
A Field-Particle Correlation Technique to Explore the Collisionless Damping of Plasma Turbulence
APS-DPP, Nov. 2016
Diagnostics for Comparing Turbulence in Solar Wind Observations and Numerical Simulations AGU, Dec. 2014
Quantitative Comparisons between Turbulence Simulations and Solar Wind Observations
SHINE Workshop, June 2014

INVITED COLLOQUIUM PRESENTATIONS [41]

Excitation and Dissipation: Kinetic-Scale Waves and Instabilities in Space Plasmas
Dartmouth College Physics Colloquium, Sept 2025
Excitation and Dissipation: Kinetic-Scale Waves and Instabilities in Space Plasmas
University of Wisconsin, Madison Plasma Physics Colloquium, Sept 2025
HelioSwarm: The Nature of Turbulence in Space Plasmas

HelioHub Solar Circuit Virtual Presentation, July 2025
Excitation and Dissipation: Kinetic-Scale Waves and Instabilities in Space Plasmas
West Virginia University KINETIC Plasma Physics Seminar, April 2025
Exploring the Slopes of Phase Space with `ALPS`: An Open-Source Code for Calculating Dispersion Relations for Non-Maxwellian Plasmas
Parker Solar Probe Theory Telecon, Feb. 2024
Excitation and Dissipation
UNH Physics Department Colloquium, Sept. 2024
The Role of Kinetic-Scale Waves and Instabilities in the Evolution of the Solar Wind
NANOGrav Noise Budget Working Group, July 2024
Using the Solar Wind as a Natural Laboratory to Study Space Plasma Turbulence
Columbia University Astronomy Department Colloquium, April 2023
The Solar Wind: A Natural Laboratory for Studying Plasma Turbulence
Aspen Center for Physics Seminar, July 2022
Solar Wind Turbulence: From the Alfven Surface to 1 au
NASA Goddard Heliophysics Science Directorate Colloquium, July 2022
HelioSwarm: Characterizing Turbulence in Space Plasma
Mullard Space Science Laboratory Seminar, University College London, June 2022
HelioSwarm: A Multi-spacecraft Mission to Study Turbulence in Space Plasmas
UT Austin Plasma Physics Colloquium, Feb. 2022
Advancing our understanding of plasma processes in the young solar wind: Recent results from Parker Solar Probe MIT Plasma Science and Fusion Center Seminar, Nov. 2021
HelioSwarm: Revealing the Nature of Turbulence in Space Plasmas
UC Berkeley Space Science Series, September 2021
Plasma Instabilities in the Young Solar Wind: Thermodynamics far from Equilibrium
UArizona Applied Maths Colloquium, April 2021
HelioSwarm: Using Multi-Point, Multi-Scale Observations to Uncover the Nature of Turbulence in Space Plasmas UNH Space Physics Colloquium, April 2021
Leveraging Multi-Point, Multi-Scale Observations to Uncover the Nature of Turbulence in Space Plasmas JPP Frontiers of Plasma Physics Colloquium, April 2021
Plasma Instabilities in the Young Solar Wind UIowa Physics and Astronomy Colloquium, March 2021
Thermodynamics in the Young Solar Wind UArizona Applied Math Seminar, March 2021
Inferred Linear Stability of SPANi Observations using One- and Two-Component Proton Velocity Distributions Parker Solar Probe Theory Working Group, Feb 2021
Plasmas far from Equilibrium Harvard Center for Astrophysics, GCSP Seminar, Feb 2021
Plasma Heating and Instabilities in the Young Solar Wind: Thermodynamics far from Equilibrium Imperial College, Space Physics Seminar, July 2020
Instabilities and Plasma Heating in the Inner Heliosphere: Thermodynamics far from Equilibrium Princeton Plasma Physics Laboratory, Heliospheric Seminar, March 2019
Thermodynamics far from Equilibrium: Studying Instabilities and Plasma Heating in the Solar Wind University College, London, Space Physics Seminar, Jan 2019
A Majority of Solar Wind Intervals Support Ion-Driven Instabilities
Wind Science Telecon, April 2018
Testing The Frequency of Ion-Driven Instabilities in the Solar Wind
Parker Solar Probe Science Working Group, Jan. 2018
A Rosetta Stone for Solar Probe Plus Heating Science
SWEAP Science Team Meeting, Dec. 2016
Can Field-Particle Correlations be used to Discern the Nature of Solar Wind Heating?
Solar Probe Plus Theory Working Group, Nov. 2016
Assessing Solar Wind Heating Through Measurement of Velocity Distribution Functions
Solar Probe Plus Science Working Group, Sept. 2016
Velocity Space Signatures of Turbulent Dissipation
Space Science Seminar - University of New Hampshire, April 2016
Reevaluating Taylor's Hypothesis in the Era of Solar Probe Plus
Solar Probe Plus Science Working Group, Feb. 2016

Characterizing Solar Wind Turbulence with Kinetic Plasma Physics
Space & Planetary Physics Seminar - University of Michigan, Jan. 2016
Observable Signatures of Stochastic Heating in the Near-Sun Solar Wind
SWEAP Science Team Meeting - UC Berkeley, Dec. 2015
Signatures of Kinetic Damping in Collisionless Plasmas
FIELDS Science Team Meeting - UC Berkeley, Dec. 2015
Applying Taylor's Hypothesis to Solar Probe Plus Perihelion Measurements
FIELDS and STEREO/WAVES Science Team Meeting - UC Berkeley, Dec. 2014
Understanding Solar Wind Turbulent Fluctuations using Linear Kinetic Physics
Plasma Physics Seminar - University of Maryland, Oct. 2014
Mapping the Kinetic Physics of Proton Temperature Anisotropies in Phase Space
Space Plasma Physics Seminar - Goddard Space Flight Center, Oct. 2014
Linear Kinetic Physics of Turbulent Fluctuations in the Solar Wind
Space Science Seminar - University of New Hampshire, March 2014
How Will the Violation of Taylor's Hypothesis Alter Turbulent Power Spectra Measured by Solar Probe Plus?
SWEAP Science Team Meeting - UC Berkeley, Dec. 2013
Identification of Compressive Fluctuations in the Solar Wind Inertial Range
Plasma Physics Seminar- University of Iowa, Oct. 2012
Using Synthetic Time Series to Understand Compressive Solar Wind Turbulence
Plasma Physics Seminar- University of Iowa, March 2011
Using MHD Theory to Understand Satellite Measurements in the Heliosphere
Plasma Physics Seminar- University of Iowa, May 2010

CONTRIBUTED CONFERENCE PRESENTATIONS [63]

Ion-Scale Wave Emission and Absorption from non-Maxwellian Velocity Distributions Measured by SWEAP/SPANi APS-DPP, Nov 2025
Non Maxwellian Wave Excitation and Dissipation: Recent Progress
SHINE Workshop, June 2025
Wave Excitation and Dissipation for Non-Maxwellian Plasmas in the Inner Heliosphere
Parker Four Workshop, May 2025
Traversing the Slopes of Phase Space with ALPS AGU Fall Meeting, Dec 2024
Error in Multi-Spacecraft Reconstruction Methods ISSI Team #556, Oct 2024
Optimal Polyhedral Selection for Wave Telescope Applications ISSI Team #556, Oct 2024
Traversing the Slopes of Phase Space with ALPS: Linear Dispersion Relations for Arbitrary Plasma Distributions APS-DPP, Oct 2024
Traversing the Slopes of Phase Space with ALPS: Linear Dispersion Relations for Arbitrary Plasma Distributions SHINE, Aug 2024
The Arbitrary Linear Plasma Solver: An Open-Source Code for Calculating Dispersion Relations for Non-Maxwellian Plasmas AGU Fall Meeting, Dec 2023
Characterizing Electromagnetic Waves using Wave-Telescope Techniques Applied to Multipoint, Multiscale Observatories AGU Fall Meeting, Dec 2023
Beyond Brazil: Numerical Tools for Studying Waves and Instabilities in non-Maxwellian Plasmas APS-DPP, Oct 2023
Studying Plasma Turbulence Using Multi-point, Multi-scale Measurements: Intermittency, Anisotropy, Correlation Scales, and Cascade Rates AGU Fall Meeting, Dec 2022
Characterizing Plasma Turbulence Using Sparse, Multi-point, Multi-scale Measurements
APS-DPP, Oct 2022
HelioSwarm: The Nature of Turbulence in Space Plasma SHINE, July 2022
HelioSwarm: The Nature of Turbulence in Space Plasma EGU, May 2022
The Scale-Filtered Correlation: A Frequency-and-Velocity Resolved Method for Characterizing the Resonant Impact of Waves AGU 2021
Inferred Linear Stability of PSP/SPAN-i Observations Modeled with One- and Two- Component Proton Distributions Parker One Conference, June 2021
HelioSwarm: Leveraging Multi-Point, Multi-Scale Spacecraft Observations to Characterize Turbulence EGU, April 2021

HelioSwarm: The Nature of Turbulence in Space Plasmas COSPAR, Jan 2021
Turbulence Analysis using Multi-Point, Multi-Scale Spacecraft Observations APS-DPP, Nov 2020
The Prevalence of ion-scale instabilities in the near-Sun Environment AGU, Dec 2019
The Ubiquity of Ion-Driven Instabilities in the Inner Heliosphere APS-DPP, Oct 2019
HelioSwarm: Revealing the Transfer of Energy Across Scales and Boundaries in Plasmas Throughout the Universe $18^{\rm th}$ International Astrophysics Conference, Feb. 2019
Testing the Utility of a Swarm of Spacecraft to Study Magnetized Turbulence $233^{\rm rd}$ AAS Meeting, Jan. 2019
On the Frequency and Drivers of Ion Scale Instabilities in the Solar Wind AGU, Dec 2018
The Occurrence Rate of Ion Driven Instabilities in the Solar Wind APS-DPP, Nov 2018
Comparing Energy Transfer in High and Low Frequency Alfvenic Turbulence APS-DPP, Nov 2018
Ion Free-Energy Sources Drive Instabilities in Half the Solar Wind SHINE, July 2018
Numerical Preparations Toward Identifying Heating Mechanisms using Distribution Function Measurements from SWEAP and Parker Solar Probe AGU, Dec. 2017
Reassessing Solar Wind Stability using Nyquist's Method APS-DPP, Oct. 2017
Numerical Support for Applying Field-Particle Correlations to Space and Laboratory Plasmas APS-DPP, Oct. 2017
An Automated Calculation of Plasma Instability for in situ Parker Solar Probe Measurements Parker Solar Probe Science Working Group Meeting, Oct 2017
Using the Arbitrary Linear Plasma Solver (ALPS) to characterize non-Maxwellian features in the solar wind SHINE Workshop, July 2017
Novel Plasma Instability Studies using the Nyquist Stability Criteria on Solar Wind Observations, National Academy of Science & Chinese Academy of Sciences Forum for New Leaders in Space Science, Woods Hole, Mass. May 2017
Applying an Efficient Method for Identifying Instabilities to Solar Wind Observations EGU, Apr. 2017
Application of Field-Particle Correlations to Space and Laboratory Plasmas Bringing Space Down to Earth, UCLA, Apr. 2017
Field-Particle Correlations as a Measure of Turbulent Damping in Collisionless Plasmas AGU, Dec. 2016
Observing the Kinetic Signature of Turbulent Damping in Numerical Simulations and Solar Wind Observations National Academy of Science & Chinese Academy of Sciences Forum for New Leaders in Space Science, Beijing, China, Dec. 2016
A Method of Measuring Turbulent Heating using Field-Particle Correlations from Single Spacecraft Observations, Arcetri Workshop on Plasma Astrophysics, Oct. 2016
Identifying Resonant Damping in Turbulence using Field-Particle Correlations SHINE Workshop, July 2016
Secular Field-Particle Energy Transfer in a Turbulent, Gyrokinetic System Fifth International Vlasovia Workshop, Calabria, Italy, May 2016
A Role for Stochastic Heating in the Near-Sun Environment AGU, Dec. 2015
Signatures of Heating via Landau Damping in Nearly Collisionless Plasmas APS-DPP, Nov. 2015
Stochastic Heating and Diffusion in the Near-Sun Solar Wind APS-DPP, Nov. 2015
Stochastic Ion Heating in the Near-Sun Environment Turbulence and Dissipation in Collisionless Astrophysical Plasmas, Cargese, France Sept. 2015
Predictions for Solar Probe Plus: The Applicability of the Taylor Hypothesis and Signatures of Stochastic Ion Heating Joint Solar Probe Plus-Solar Orbiter Workshop, Florence, Italy, Sept. 2015
Effects of Proton Temperature Anisotropy on Unstable Eigenmodes and Solar Wind Turbulence SHINE Workshop, July 2015
Impact of Proton Temperature Anisotropy and Instability on Solar Wind Turbulence Turbulence, Magnetic Fields, and Self-Organization in Laboratory and

Astrophysical Plasmas - Winter School, Les Houches, France, March 2015
Predictions for Near Sun Turbulent Spectra from Synthetic Time Series AGU, Dec. 2014
Predictions for in situ Observations of Turbulent Power Spectra within the Alfvén Critical Point APS-DPP, Oct. 2014
Simulation of Alfvén Wave Distribution Function Structure SHINE Workshop, June 2014
How Will the Violation of Taylor's Hypothesis Alter the Turbulent Power Spectra Measured by Solar Probe Plus? AGU, Dec. 2013
Effects of the Violation of Taylor's Hypothesis on Observed Turbulent Power Spectra in the Solar Wind APS-DPP, Nov. 2013
Uses and Limitations of Synthetic Spacecraft Data for Studying Solar Wind Turbulence Models, SHINE Workshop, June 2013
Identification of Linear Modes in the Solar Wind Dissipation Range Using Magnetic Helicity The Future of Plasma Astrophysics, Feb. 2013
Using Plasma Metrics as a Diagnosis of Solar Wind Mode Composition APS-DPP, Nov. 2012
Analyzing Compressive Fluctuations at Inertial and Dissipative Scales in Solar Wind Turbulence using Linear Synthetic Data and Non-linear Simulations SHINE Workshop, June 2012
Identification of Compressive Fluctuations in the Solar Wind Inertial Range APS-DPP, Nov. 2011
Interpreting Compressive Solar Wind Fluctuations using Synthetic Spacecraft Data SHINE Workshop, July 2011
Understanding Compressive Fluctuations in Solar Wind Turbulence using Synthetically Generated Data APS-DPP, Nov. 2010
Numeric Solution of Plasma Impulse Response with Model Fokker-Planck Operator American Physical Society-Prairie Section, Nov. 2009
Branching Fraction Measurements for Dipion Transitions American Physical Society- April Meeting, April 2008

Awarded Grants and Contracts

Tracing the Flow of Energy that Heats and Accelerates Solar-Wind Streams that Originate in Coronal Holes
NASA Heliophysics Theory Simulation and Modeling, 2024-2028
Subcontract from UNH (PI Benjamin Chandran)
Co-Investigator $126,313 subcontract ($1,452,000 total)
Study of Ion Velocity Distributions and Kinetic Wave Activity Observed in the Acceleration Region of the Solar Wind with Theory, Modeling, and Machine Learning
NASA Heliophysics Theory Simulation and Modeling, 2024-2025
Subcontract from CUA (PI Leon Ofman)
Co-Investigator $67,000 subcontract ($457,000 total)
HelioSwarm: The Nature of Turbulence in Space Plasma
NASA Medium Class Explorer Mission, 2022-2030
Deputy Principal Investigator, $263,442 subcontract to UArizona.
Total Mission Cost Cap $250 million.
Principal Investigator: Harlan Spence (UNH)
Project Manager: Butler Hines (NASA Ames)
Project System Engineer: Brittney Wickizer (NASA Ames)
Non-linear Solar Wind Turbulent Heating from 0.08 to 5.2 AU
NASA Living with a Star Research Grant, 2022-2026.
UArizona Principal Investigator Mihailo Martinović
Co-Investigator, $965,355 total award
Responsible for 5% of overall collaborative proposal.
Improved Characterization of Solar Wind Dissipation, Energization, and Stability
NASA Early Career Investigator Program, 2019-2024
Principal Investigator for $607,946 total funding.

Sole Investigator, responsible for 100% of effort on grant.
Co-Is: None

SWEAP Investigation: Wave Particle Correlation
NASA Parker Solar Probe Phase E Activities, 2020-2026
Subcontract from Smithsonian Astrophysical Observatory (PI Justin Kasper).
Principal Investigator of $\$270,946$ subcontract. (Total Mission Cost $\sim \$1.5$ Billion)
Sole Investigator on subcontract, responsible for 5% of overall contract activities.
Co-Is: SWEAP Science Team
University of Michigan: Justin Kasper
Smithsonian Astrophysical Observatory: Tony Case, Leon Golub, Kelly Korreck, Michael Stevens
University of California, Berkeley: Stuart Bale, Davin Larson, Roberto Livi, Jim McFadden, Phyllis Whittlesey
JHU - Applied Physics Lab: George Ho
Laboratoire de Physique des Plasmas: Matthieu Berthomier
Los Alamos National Lab: Peter Gary, Ruth Skoug, John Steinberg
Massachusetts Institute of Technology: John Belcher, John Richardson
NASA - Goddard Space Flight Center: Adam Szabo
NASA - Marshall Space Flight Center: Dennis Gallagher
University of Alabama, Huntsville: Qiang Hu, Nikolai Pogorelov, Gary Zank
University of Colorado, Boulder: Steven Cranmer
University of Iowa: Jasper Halekas
University Space Research Association: Ken Wright

Coupling of Electron and Ion Kinetic Physics via Collisions and Instabilities in the Expanding Solar Wind
NASA Heliophysics Supporting Research Grant, 2019-2022
Subcontract from University of Maryland (PI Peter Yoon).
Co-Investigator for $\$67,948$ subcontract. ($\sim$\$366,000 total award)
Sole UArizona Principal Investigator, responsible for 10% of overall grant activities.
Co-Is: Dr. Chadi Salem (SSL)

Hybrid Kinetic-GRMHD simulations of Black Hole Accretion with Data-Calibrated Electron Physics
NASA Astrophysics Theory Program, 2020-2023
Contract to UArizona Dept. Astronomy (PI Feryal Ozel).
Co-Investigator, Total UArizona Budget $\$470,310$.
Responsible for 15% of overall grant activities.
Co-Is: Prof. Dimitrios Psaltis (UArizona)

Parametric Instability in the Inner Heliosphere
NASA Heliophysics Supporting Research Grant, 2019-2022
Subcontract from University of New Hampshire (PI Benjamin Chandran).
Co-Investigator, $\$76,689$ sub-contract.($\sim$\$404,00 total award)
Sole UArizona Investigator, responsible for 10% of overall grant activities.
Co-Is: Prof. Stuart Bale, Dr. Trevor Bowen (SSL)
Prof. Kai Germanschewski, Mr. Kyle Morman (UNH)

Investigation of Electron Parameter Statistical Distributions and Association with Structures using QTN Spectroscopy
NASA Unsolicited Grant, 2019-2022
Principal Investigator $\$150,792$ total funding.
Sole UArizona Principal Investigator, responsible for 100% of grant activities.
Co-Is: Dr. Mihailo Martinović (UArizona)

Assessing the Relative Importance of Stochastic and Resonant Ion Heating the Solar Wind
NASA Heliophysics Supporting Research Grant, 2016-2019
Principal Investigator $\$377,000$ total funding.
Sole UArizona Principal Investigator, responsible for 100% of grant activities.

Co-Is: Prof. Benjamin Chandran (UNH) Dr. Sofiane Bourouaine (FIT)

Vlasov-Maxwell Simulations to Resolve Electron Heating and Dissipation in Quasi-Perpendicular Shocks NSF-DOE Basic Plasma Physics, 2019-2022,
Collaborative Proposal with Princeton University (PI Jason TenBarge)
and University of Maryland (PI Li-Jen Chen)
Co-Principle Investigator, $\$73,749$.
Sole UArizona Investigator, responsible for 15% of overall collaborative proposal.
Co-Is: Dr. Shan Wang (UMaryland)

Non-Maxwellian Distribution Functions in the Solar Wind: Dispersion Relations and Instabilities
NASA Heliophysics Supporting Research Grant, 2016-2020,
Subcontract from University of New Hampshire (PI Benjamin Chandran).
Co-Investigator, $\$150,000$ sub-contract ($502,919 total award).
Sole UArizona Investigator, responsible for 35% of overall grant effort.
Co-Is: Dr. Daniel Verscharen (UCL) Prof. Stuart Bale, Dr. Chadi Salem (SSL)
Dr. Michael Stevens (SAO)

Understanding the Nature of Turbulent Fluctuations in the Near-Sun Solar Wind
NSF AGS Postdoctoral Research Fellowship, 2014-2016
Principal Investigator, $\$172,000$ total funding.
Sole Investigator, responsible for 100% of overall proposal.

Submitted Grants & Contracts

PENDING APPLICATIONS

UNAWARDED APPLICATIONS

Comprehensive Analysis of Spatio-temporal Plasma Emissions and Resonances (CASPER) CubeSat Mission Study
NASA HFOS 2024
PI Mihailo Martinovic
Co-Investigator $223,658 total

Phase Space in Your Web Browser: The Next Generation of Kinetic Analysis Tools
NASA OSTFL 2024
Subcontract from Princeton University (PI Jason TenBarge)
Institutional PI $2,346,356 total ($400,001 subcontract)

Stellar flares and their Impact on Exoplanet Atmospheres
NASA XRP 2024
PI Travis Barman
Co-Investigator $504,336 total

Statistical Properties of Electrons in the Solar Wind
NASA HGIO 2024
Subcontract from NASA Goddard (PI Lynn Wilson)
Co-Investigator $515,197 total ($106,879 subcontract)

The Evolution and Heating of Switchbacks in the Inner Heliosphere
NASA HGIO 2024
Subcontract from UC Berkeley (PI Jia Huang)
Co-Investigator $523,726 total ($238,225 subcontract)

Connecting Plasma Waves, non-Parametric VDFs, and Turbulent Dissipation using Solar Orbiter
NASA Solar Orbiter Guest Investigator 2024.
Subcontract from UC Berkeley (PI Trevor Bowen)
Co-Investigator $130,000 subcontract ($758,000 total)

Leveraging a 10-moment, 2-fluid solver to investigate pressure anisotropy-driven instabilities
NASA FINESST 2022-2025
Principal Investigator, $150,000 total award.
Future Investigator Jada Walters[4]
Mathematical Analysis of Multi-Point Spacecraft Observatory Data
NASA FINESST 2022-2025
Principal Investigator, $150,000 total award.
Future Investigator Teddy Broeren[5]
Heating of the Expanding Solar Wind Through Imbalanced Kinetic Turbulence and Alfvénic Switchbacks
NASA Heliospheric Supporting Research Grant, 2022-2025.
Subcontract from Princeton University (PI Matthew Kunz)
Co-Investigator, $96,309 subcontract ($579,032 total award).
Sole UArizona Investigator, responsible for 15% of overall collaborative proposal.
Is Alfvén Wave Turbulence Heating and Accelerating the Solar Wind?
NASA Parker Solar Probe Guest Investigator, 2021-2024.
Subcontract from University of Michigan (PI Bart van der Holst)
Co-Investigator, $112,526 subaward ($449,781 total award)
Sole UArizona Investigator, responsible for 10% of overall collaborative proposal.
Mathematical Analysis of Multi-Point Spacecraft Observatory Data
NASA Minority Serving Institution Fellowship 2022-2025
Principal Investigator, $150,000.
Co-Investigator Teddy Broeren[6]
Investigation of Solar Wind Heating Development in Plasma Streams from Photosphere to 1 AU NASA Heliophysics Observatory Connect Research Grant, 2020-2023.
UArizona Principal Investigator Mihailo Martinović
Co-Investigator, $1,643,507 total award
Responsible for 10% of overall collaborative proposal.
Kinetic Turbulence, Instabilities, and Particle Heating in an Expanding Solar Wind
NASA Heliospheric Supporting Research Grant, 2020-2023.
Subcontract from Princeton University (PI Matthew Kunz)
Co-Investigator, $56,676 subcontract ($588,126 total award)
Sole UArizona Investigator, responsible for 15% of overall collaborative proposal.
DRIVE Center for Kinetic Heliophysics
NASA DRIVE Center Proposal, 2019-2021.
Subcontract from University of Iowa (PI Gregory Howes)
Co-Investigator, $116,100 subcontract (∼$1.3 Million total award)
Sole UArizona Investigator, responsible for 5% of overall collaborative proposal.
Heliospheric and Coronal Turbulence Integrated Center (HeCTIC)
NASA DRIVE Center Proposal, 2019-2021.
Subcontract from University of Michigan (PI Ward Manchester)
Co-Investigator, $180,529 subcontract (∼$1.3 Million total award)
Sole UArizona Investigator, responsible for 5% of overall collaborative proposal.
Quantifying Phase-Space Fluctuations of Solar-Wind Ions
NASA Heliospheric Guest Investigator Open, 2019-2022.
Subcontract from University of Delaware (PI Bennett Maruca)
Co-Investigator, $142,761 subcontract ($523,426 total award)
Sole UArizona Investigator, responsible for 15% of overall collaborative proposal.

Last updated: January 26, 2026

[4]Graduate student who will be leading proposed research effort.
[5]id.
[6]id.