Kristopher G. Klein: Curriculum Vitae

Department of Planetary Sciences, University of Arizona
431 Kuiper Space Sciences
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EDUCATION

University of Iowa — **Iowa City, IA**
Doctor of Philosophy in Physics — Dec. 2013
The Kinetic Plasma Physics of Solar Wind Turbulence — 10.5281/zenodo.50471
Chair: G.G. Howes *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**
Assistant Professor, Dept. Planetary Sciences & LPL — 2018-present

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

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
NSF 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; External Reviewer - 2015

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

DEPARTMENT OF ENERGY: External Reviewer - 2020

UNITED KINGDOM RESEARCH COUNCIL: External Reviewer - 2021

Professional Service

Executive Committee Member-at-Large, Topical Group of Plasma Astrophysics, American Physical Society Division of Plasma Physics: 2018-2021

Treasurer, Topical Group of Plasma Astrophysics, American Physical Society Division of Plasma Physics: 2021-

Program Committee, American Physical Society Division of Plasma Physics: 2023

Parker Two Conference Science Organizing Committee (2022)

COSPAR Session Organizing Committee: PSP Session (2022)

Parker Solar Probe Science Working Group Local Organizing Committee (Fall 2022)
SHINE Workshop Session Organizer: 2015-2019,2022
SHINE Steering Committee: 2023-
Parker Solar Probe Science Working Group Lead Organizer: Fall 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[32]: Nature Physics[1], Nature Communications[1],
Journal of Plasma of Physics[5], Physics of Plasmas[4], Physical Review Letters [2],
Journal of Geophysical Research [2], The Astrophysical Journal Letters[3],
The Astrophysical Journal[8], Annales Geophysicae[3], Frontiers: Space Sciences [1]

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-present
Theoretical Astrophysics Program Colloquium Committee: 2019-present
Graduate Advising and Admissions Committee: 2018-present (Chair 2021-2022)
Journal Club Advisor: 2018-2019

OUTREACH

Public Seminars [7]

HelioSwarm: A Future NASA 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: What we are learning from 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, Feb. 2019

A Mission to Touch the Sun: What we are learning from NASA's Parker Solar Probe
49^{th} Smithsonian Lecture Series in Astronomy, Jan. 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 Parker Solar Probe LPL Evening Seminar, Sept. 2018

PUBLICATIONS

PEER REVIEWED JOURNAL ARTICLES
[91 Articles; h-index 32, i10-index: 66, 3017 citations][1,2,3]

[1]As of February 11, 2023 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.

[91]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

[90]Shankarappa, N°, **Klein, K. G.**, and Martinović, M.M., *Estimation of turbulence proton and electron heating rates via Landau damping constrained by Parker Solar Probe observations* ApJ, **xxx** x, 2023, doi: 10.3847/1538-4357/ac93f5

[89]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

[88]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

[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: 4**

[86]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

[85]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: 2**

[84]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**

[83]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: 1**

[82]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: 6**

[81]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: 50**

[80]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: 3**

[79]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: 1**

[78]Vech, D. et al. (6^{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: 2**

[77]Broeren, T.°, **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

[76]Juno, J, et al. (7^{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: 5**

[75]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: 6**

[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: 16**

[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

[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: 24**

[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: 23**

[70]Vech, D., Martinović, M.M.°, **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: 8**

[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: 3**

[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: 5**

[67]Martinović, M. M.°, **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: 16**

[66]Perez, J. C., Chandran. B. D. G., **Klein, K. G.**, & Martinović, M. M.° *How Alfvén waves energize the solar wind: heat versus work* J. Plasma Phys. **87**, 905870218, 2021 doi: 10.1017/S0022377821000167 **Citations: 3**

[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: 15**

[64]Beatty, C.B et al(5^{th} of 8 authors) *Creation of large temperature anisotropies in a laboratory plasma*, PoP **27**, 122101, 2020 doi: 10.1063/5.0029315 **Citations: 6**

[63]Bourouaine, S., Perez, J.C., **Klein, K. G.**, et al (8 authors) *Turbulence Characteristics of Switchback and Nonswitchback Intervals Observed by Parker Solar Probe*, ApJL. **904**, L30, 2020 doi: 10.3847/2041-8213/abbd4a **Citations: 21**

[62]Woolley, T. et al. (11^{th} of 13 authors) *Proton core behaviour inside magnetic field switchbacks* MNRAS **498**, 4, 2020 doi: 10.1093/mnras/staa2770 **Citations: 22**

[61]Chen, Y. et al (12^{th} of 18 authors) *Small-scale Magnetic Flux Ropes in the First Two Parker Solar Probe Encounters*, ApJ **903**, 76, 2020 doi: 10.3847/1538-4357/abb820 **Citations: 17**

[60]Kawazura, Y. et al. (7^{th} of 8 authors) *Ion versus electron heating in compressible driven gyrokinetic turbulence* PRX **10**, 4, 2020 doi: 10.1103/PhysRevX.10.041050 **Citations: 12**

[59]**Klein, K. G.**, Howes, G. G., TenBarge, J.M., & Valentini, F, *Diagnosing collisionless energy transfer using field-particle correlations: Alfvén-ion cyclotron turbulence*, J. Plasma Phys. **86**, 905860402, 2020 doi: 10.1017/S0022377820000689 **Citations: 19**

[58]Martinović, M. M.°, **Klein, K. G.,** et al(9 authors), *Solar Wind Electron Parameters Determination on Wind Spacecraft Using Quasi-Thermal Noise Spectroscopy* JGR, 2020 doi: 10.1029/2020JA028113 **Citations: 1**

[57]Verscharen, D., Parashar, T. N., Gary, S. P., & **Klein, K. G.**, *Dependence of kinetic plasma waves on proton-to-electron mass ratio and light-to-Alfvén speed ratio*, MNRAS, **494**, 2905-2911, 2020 doi: 10.1093/mnras/staa977 **Citations: 3**

[56]Verniero, J. et al., (7^{th} of 22 authors), *Parker Solar Probe Observations of Proton Beams Simultaneous with Ion-scale Waves* ApJS, **248** 5, 2020, doi: 10.3847/1538-4365/ab86af **Citations: 41**

[55]Lavraud, B, et al., (22^{nd} of 39 authors), *The Heliospheric Current Sheet and Plasma Sheet during Parker Solar Probe's First Orbit* ApJL, **894** L19, 2020, doi: 10.3847/2041-8213/ab8d2d **Citations: 28**

[54]Whittlesey, P. L. et al., (12^{th} of 22 authors), *The Solar Probe ANalysers - Electrons on Parker Solar Probe* ApJS, **246** 74, 2020, doi: 10.3847/1538-4365/ab7370 **Citations: 84**

[53]Huang, J., Kasper, J., Vech, D., **Klein, K. G.** et al., (30 authors) *Proton Temperature Anisotropy Variations in Inner Heliosphere Estimated with First Parker Solar Probe Observations* ApJS, **246** 70, 2020, doi: 10.3847/1538-4365/ab74e0 **Citations: 46**

[52]Bowen, T. S., Mallet, A, Huang, J., **Klein, K. G.** et al., (25 authors), *Ion Scale Electromagnetic Waves in the Inner Heliosphere* ApJS, **246** 66, 2020, doi: 10.3847/1538-4365/ab6c65 **Citations: 52**

[51]Chen, C. H. K. et al., (13^{th} of 24 authors), *The Evolution and Role of Solar Wind Turbulence in the Inner Heliosphere* ApJS, **246** 53, 2020, doi: 10.3847/1538-4365/ab60a3 **Citations: 126**

[50]Vech, D., Kasper, J. C., **Klein, K. G.** et al. (20 authors), *Kinetic Scale Spectral Features of Cross Helicity and Residual Energy in the Inner Heliosphere*, ApJS, **246** 52, 2020, doi: 10.3847/1538-4365/ab60a2 **Citations: 11**

[49]Bandyopadhyay, R. et al., (26^{th} of 28 authors), *Enhanced Energy Transfer Rate Observed near the Sun from Parker Solar Probe* ApJS, **246** 48, 2020, doi: 10.3847/1538-4365/ab5dae **Citations: 49**

[48]Horbury, T. S. et al., (14^{th} of 24 authors), *Sharp Alfvénic Impulses in the near-Sun solar wind* ApJS, **246** 45, 2020, doi: 10.3847/1538-4365/ab5b15 **Citations: 99**

[47]Case, A. W. et al., (17^{th} of 18 authors), *The Solar Probe Cup on Parker Solar Probe* ApJS, **246** 43, 2020, doi: 10.3847/1538-4365/ab5a7b **Citations: 113**

[46]Kim, T. K. et al., (22^{nd} of 23 authors), *Predicting the Solar Wind at Parker Solar Probe using an Empirically Driven MHD Model* ApJS, **246** 40, 2020, doi: 10.3847/1538-4365/ab58c9 **Citations: 12**

[45]Adhikari, L. et al., (11^{th} of 11 authors), *Turbulent Transport Modeling and First Orbit Parker Solar Probe (PSP) Observations* ApJS, **246** 38, 2020, doi: 10.3847/1538-4365/ab5852 **Citations: 42**

[44]Tenerani, A. et al., (13^{th} of 21 authors), *Magnetic Field Kinks and Folds in the Solar Wind* ApJS, **246** 32, 2020, doi: 10.3847/1538-4365/ab53e1 **Citations: 72**

[43]Martinović, M.°, **Klein**, K. G., et al., (21 authors), *The Enhancement of Proton Stochastic Heating in the near-Sun Solar Wind* ApJS, **246** 30, 2020, doi: 10.3847/1538-4365/ab527f **Citations: 21**

[42]Giacalone, J. et al., (20^{th} of 35 authors), *Solar Energetic Particles Produced by a Slow Coronal Mass Ejection at* ~ 0.25 *AU* ApJS, **246** 29, 2020, doi: 10.3847/1538-4365/ab5221 **Citations: 32**

[41]Zhao, L. et al., (20^{th} of 20 authors), *Identification of Magnetic Flux Ropes from PSP Observations during the First Encounter* ApJS, **246** 26, 2020, doi: 10.3847/1538-4365/ab4ff1 **Citations: 49**

[40]Halekas, J. S. et al., (11^{th} of 17 authors), *Electrons in the Young Solar Wind: First Results from Parker Solar Probe* ApJS, **246** 22, 2020, doi: 10.3847/1538-4365/ab4cec **Citations: 84**

[39]Kasper, J. C. et al., (16^{th} of 41 authors), *Alfvénic Velocity Spikes and Large Rotational Flows in the Near-Sun Solar Wind*, Nature, 2019, doi: 10.1038/s41586-019-1813-z **Citations: 236**

[38]Verscharen, D., **Klein, K. G.**, & Maruca, B.M. *The Multiscale Nature of the Solar Wind*, LRSP, 2019, 16:5 doi: 10.1007/s41116-019-0021-0 **Citations: 155**

[37]**Klein, K. G.**, Martinović, M.°, Stansby, D., & Horbury, T., *Linear Stability in the Fast Solar Wind: Helios Reëvaluated*, ApJ, **887** 234, 2019, doi: 10.3847/1538-4357/ab5802 **Citations: 15**

[36]Yoon, P.H., Seough, J, Salem, C, & **Klein, K. G.**, *Solar wind temperature isotropy*, PRL **123**, 145101, 2019, doi:10.1103/PhysRevLett.123.145101 **Citations: 18**

[35]Sharma Pyakurel P.S. et al (8^{th} of 12 authors) *Transition from ion-coupled to electron-only reconnection: Basic physics and implications for plasma turbulence* P. Plasma **26**, 082307, 2019, doi:10.1063/1.5090403 **Citations: 42**

[34]Li, T. C., Howes, G. G., **Klein, K. G.**, Liu, Y.H., & TenBarge, J.M. *Collisionless Energy Transfer in Kinetic Turbulence: Field-Particle Correlations in Fourier Space*, J. Plasma Phys., **85**, 905850406, 2019, doi:10.1017/S0022377819000515 **Citations: 14**

[33]Martinović, M. M.°, **Klein, K. G.**, & Bourouaine, S *Radial Evolution of Stochastic Heating in low-*β *Solar Wind* ApJ, **879** 43, 2019, doi:10.3847/1538-4357/ab23f4 **Citations: 14**

[32]Mallet, A., **Klein, K. G.** et al (8 authors) *Interplay between intermittency and dissipation in collisionless plasma turbulence* J. Plasma Phys. **85**, 175850302, 2019, doi:10.1017/S0022377819000357 **Citations: 17**

[31]Kasper, J. C. & **Klein, K. G.** *Strong Preferential Ion Heating is Limited to within the Solar Alfven Surface*, ApJL, **877** L35, 2019, doi:10.3847/2041-8213/ab1de5 **Citations: 16**

[30]Chen, C. H. K, **Klein, K. G.**, & Howes, G. G., *Evidence for Electron Landau Damping in Space Plasma Turbulence* Nature Communications **10** 740 2019, doi:10.1038/s41467-019-08435-3 **Citations: 97**

[29]van der Holst, B., Manchester, W. B., **Klein, K. G.**, & Kasper, J. C. *Predictions of the First Parker Solar Probe Encounter*, ApJL **872** L18, 2019, doi:10.3847/2041-8213/ab04a5 **Citations: 20**

[28]Hoppock, I.W., Chandran, B.D.G., **Klein, K. G.**, Mallet, A., & Verscharen, D. *Stochastic proton heating by kinetic-Alfvén-wave turbulence in moderately high-β plasmas* J. Plasma Phys. **84**, 905840615 2018, doi:10.1017/S0022377818001277 **Citations: 17**

[27]Verscharen, D, **Klein, K. G.** et al (6 authors), *ALPS: The Arbitrary Linear Plasma Solver*, J. Plasma Phys. **84**, 905840403 2018, doi:10.1017/S0022377818000739 **Citations: 15**

[26]Vech, D., **Klein, K. G.** & Kasper, J. C. *Large-scale Control of Kinetic Dissipation in the Solar Wind* ApJL **863** L4 2018, doi:10.3847/2041-8213/aad329 **Citations: 4**

[25]Wilson III, L. B. et al (4^{th} of 8 authors) *The Statistical Properties of Solar Wind Temperature Parameters Near 1 AU* ApJ Supp. **236** 41 2018, doi:10.3847/1538-4365/aab71c **Citations: 76**

[24]**Klein, K. G.**, Alterman, B. L., Stevens, M. L., Vech, D., & Kasper, J. C. *Majority of Solar Wind Intervals Support Ion-Driven Instabilities* PRL **120**, 205102, 2018, doi:10.1103/PhysRevLett.120.205102 **Citations: 44**

[23]Kunz, M. W., Abel, I. G., **Klein, K. G.** & Schekochihin, A. A., *Astrophysical gyrokinetics: Turbulence in pressure-anisotropic plasmas at ion scales and beyond*, J. Plasma Phys. **84**, 715840201 2018, doi:10.1017/S0022377818000296 **Citations: 15**

[22]Vech, D, Mallet, A, **Klein, K. G.** & Kasper, J. C. *Magnetic Reconnection May Control the Ion-scale Spectral Break of Solar Wind Turbulence*, ApJL **855** L27 2018, doi:10.3847/2041-8213/aab351 **Citations: 37**

[21]Howes, G. G., McCubbin, A. J. & **Klein, K. G.**, *Spatially Localized Particle Energization by Landau Damping in Current Sheets Produced by Alfvén Wave Collisions*, J. Plasma Phys. **84** 905840105, 2018, doi:10.1017/S0022377818000053 **Citations: 28**

[20]Verniero, J. L., Howes, G. G., & **Klein, K. G.**, *Nonlinear energy transfer and current sheet development in localized Alfvén wavepacket collisions in the strong turbulence limit*, J. Plasma Phys. **84**, 905840103, 2018 doi:10.1017/S0022377817001003 **Citations: 12**

[19]Vech, D., **Klein, K. G.,** & Kasper, J. C. *Nature of Stochastic Ion Heating in the Solar Wind: Testing the Dependence on Plasma Beta and Turbulence Amplitude*, ApJL **850** L11 2017, doi:10.3847/2041-8213/aa9887 **Citations: 32**

[18]Kasper, J., **Klein, K. G.** et al (9 authors), *A Zone of Preferential Ion Heating Extends Tens of Solar Radii from the Sun* ApJ **849** 126, 2017 doi:10.3847/1538-4357/aa84b1 **Citations: 30**

[17]**Klein, K. G.**, Kasper, J.C., Korreck, K.E., & Stevens, M.L. *Applying Nyquistś Method for Stability Determination to Solar Wind Observations*, J. Geophys. Res. Space Physics, 122, 2017 doi:10.1002/2017JA024486 **Citations: 15**

[16]**Klein, K. G.**, Howes, G. G., & TenBarge, J.M., *Diagnosing collisionless energy transfer using field-particle correlations: gyrokinetic turbulence*, J. Plasma Phys. **83**, 535830401, 2017 doi:10.1017/S0022377817000563 **Citations: 42**

[15]**Klein, K. G.**, *Characterizing Fluid and Kinetic Instabilities using Field-Particle Correlations on Single-Point Time Series*, Phys. Plasmas **24**, 055901, 2017 doi:10.1063/1.4977465 **Citations: 16**

[14]Howes, G. G., **Klein, K. G.**, & Li, T. C. *Diagnosing Collisionless Energy Transfer Using Field-Particle Correlations: Vlasov-Poisson Plasmas*, J. Plasma Phys. **83**, 705830102, 2017 doi:10.1017/S0022377816001197 **Citations: 41**

[13]Li, T. C., Howes, G. G., **Klein, K. G.**, & TenBarge, J. M. *Energy Dissipation and Landau Damping in Two- and Three-Dimensional Plasma Turbulence*, ApJL **832** L24, 2016, doi:10.3847/2041-8205/832/2/L24 **Citations: 36**

[12]Verscharen, D., Chandran, B. D. G., **Klein, K. G.** & Quataert, E. *Collisionless Isotropization of the Solar Wind by Compressive Fluctuations and Plasma Instabilities*, ApJ **831** 128, 2016, doi:10.3847/0004-637X/831/2/128 **Citations: 43**

[11]**Klein, K. G.** & Howes, G. G. *Measuring Collisionless Damping in Heliospheric Plasmas using Field-Particle Correlations*, ApJ Lett **826** L30, 2016, doi:10.3847/2041-8205/826/2/L30 **Citations: 53**

[10]**Klein, K. G.** & Chandran, B. D. G. *Evolution of the Proton Velocity Distribution due to Stochastic Heating in the Near-Sun Solar Wind*, ApJ **820** 47, 2016, doi:10.3847/0004-637X/820/1/47 **Citations: 21**

[9]Chandran, B. D. G., Perez, J. C., Verscharen, D., **Klein, K. G.**, & Mallet, A *On the Conservation of Cross Helicity and Wave Action in Solar-Wind Models with non-WKB Alfvén Wave Reflection*, ApJ **811** 50, 2015, doi:10.1088/0004-637X/811/1/50 **Citations: 6**

[8]**Klein, K. G.** & Howes, G. G. *Predicted Impacts of Proton Temperature Anisotropy on Solar Wind Turbulence*, Phys. Plasmas, **22**, 032903, 2015, doi:10.1063/1.4914933 **Citations: 44**

[7]**Klein, K. G.**, Perez, J. C., Verscharen, D., Mallet, A., & Chandran, B .D. G. *A Modified Version of Taylor's Hypothesis for Solar Probe Plus Observations* ApJ Lett, **801** L18, 2015, doi:10.1088/2041-8205/801/1/L18 **Citations: 23**

*[6]**Klein, K. G.**, Howes, G. G., & TenBarge, J. M. *The Violation of the Taylor Hypothesis in Measurements of Solar Wind Turbulence*, ApJ Lett, **790** L20, 2014, doi:10.1088/2041-8205/790/2/L20 **Citations: 41**

*[5]Howes, G. G., **Klein, K. G.**, & TenBarge, J. M. *Validity of the Taylor Hypothesis for Linear Kinetic Waves in the Weakly Collisional Solar Wind*, ApJ, **789** 106, 2014, doi:10.1088/0004-637X/789/2/106 **Citations: 58**

*[4]**Klein, K. G.**, Howes, G. G., TenBarge, J. M., & Podesta, J. J. *Physical Interpretation of the Angle Dependent Magnetic Helicity Spectrum in the Solar Wind: The Nature of Turbulent Fluctuations near the Proton Gyroradius Scale* ApJ, **785** 138, 2014, doi:10.1088/0004-637X/785/2/138 **Citations: 55**

*[3]**Klein, K. G.** et al (6 authors) *Using Synthetic Spacecraft Data to Interpret Compressible Fluctuations in Solar Wind Turbulence*, ApJ, **755** 159, 2012, doi:10.1088/0004-637X/755/2/159 **Citations: 87**

*[2]Howes, G. G., Bale, S. D., **Klein, K. G.** et al (6 authors) *The slow-mode nature of compressible wave power in solar wind turbulence*, ApJ Lett, **753** L19, 2012, doi:10.1088/2041-8205/753/1/L19 **Citations: 133**

*[1]TenBarge, J. M., Podesta, J. J., **Klein, K. G.**, & Howes, G. G. *Interpreting Magnetic Variance Anisotropy Measurements in the Solar Wind*, ApJ **753** 107, 2012, doi:10.1088/0004-637X/753/2/107 **Citations: 59**

CONFERENCE PROCEEDINGS & WHITE PAPERS [8]

Martinović, M.. **Klein, K. G.** & Krishnan, H. G. *Wind/Waves Antenna Length Determined Using Quasi-Thermal Noise Spectroscopy*, RNAAS, 2022, doi: 10.3847/2515-5172/ac8b0a

Huang, J. et al., (5^{th} of 32 authors) *Alfvénic Slow Solar Wind Observed in the Inner Heliosphere by Parker Solar Probe*, arxiv:2005.12372 **Citations: 4**

Chen, L. J. et al. (10^{th} of 21 authors) *Challenges and the next transformative steps in understanding plasma turbulence from the perspective of multi-spacecraft measurements* arxiv:1908.04192 **Citations: 1**

Klein, K. G. & Vech, D. *Solar Wind Plasma Parameter Distributions at 1 au*, RNAAS, 2019, doi: 10.3847/2515-5172/ab3465 **Citations: 3**

Klein, K. G. et al. (24 authors) *Multipoint Measurements of the Solar Wind: A Proposed Advance for Studying Magnetized Turbulence* arXiv:1903.05740 **Citations: 15**

TenBarge, J. M. et al. (11^{th} of 29 authors) *Disentangling the Spatiotemporal Structure of Turbulence Using Multi-Spacecraft Data*, arXiv:1903.05710 **Citations: 6**

Matthaeus, W. H. (21^{st} of 49 authors) *The essential role of multi-point measurements in turbulence investigations: the solar wind beyond single scale and beyond the Taylor Hypothesis*, arXiv:1903.06890 **Citations: 8**

*Howes, G. G., **Klein, K. G.**, & TenBarge, J. M. *The Quasilinear Premise for the Modeling of Plasma Turbulence*, arXiv:1404.2913 **Citations: 13**

*Chen, C. H. K. et al (5^{th} of 6 authors)*Kinetic Scale Density Fluctuations in the Solar Wind* Solar Wind 13 Proceedings **1539** 143, 2013, doi:10.1063/1.4811008 **Citations: 31**

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.

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]

Arbitrary Linear Plasma Solver (ALPS; FORTRAN)

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].

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 [22]

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^{th} International Astrophysics Conference, March 2020

Kinetic Instabilities in Magnetized, Collisionless Plasmas 12^{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^{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^{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^{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 [34]

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 [51]

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^{th} International Astrophysics Conference, Feb. 2019

Testing the Utility of a Swarm of Spacecraft to Study Magnetized Turbulence
233^{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

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

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.

UNAWARDED APPLICATIONS

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)

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

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: February 11, 2023