Seiji ZENITANI

Institut für Weltraumforschung (Space Research Institute) Office: +43 (316) 4120-634
Schmiedlstraße 6, 8042 Graz, Austria seiji.zenitani [at] oeaw.ac.at

Research interests
Magnetic reconnection, astrophysical jets, collisionless shocks, relativistic astrophysics, kinetic plasma instabilities, particle-in-cell (PIC) simulation, magnetohydrodynamic (MHD) simulation

Academic Training
2006 Ph.D. in space physics, **University of Tokyo**, Japan
"High-energy particle acceleration and magnetic field dissipation in the plasma sheets of celestial magnetospheres" (advisor: Prof. Masahiro Hoshino)
2001 M.A. in space physics, **University of Tokyo**, Japan
1999 B.S. in Science, **Kyoto University**, Japan

Research Experience
2023 – 2029 **Austrian Academy of Sciences**, Graz, Austria
Academy Scientist, Institut für Weltraumforschung (Space Research Institute) (2023/04 – 2029/03)
2019 – 2023 **Kobe University**, Kobe, Japan
Associate Professor, Graduate School of Engineering (2019/05 – 2023/03)
Associate Professor, Research Center for Urban Safety and Security (2019/04 – 2023/03)
2017 – 2019 **Kyoto University**, Uji, Kyoto, Japan
Designated Lecturer, Research Institute for Sustainable Humanosphere (2018/06 – 2019/03)
Researcher, Research Institute for Sustainable Humanosphere (2017/04 – 2019/03)
2011 – 2017 **National Astronomical Observatory of Japan**, Mitaka, Tokyo, Japan
Research Assistant Professor, NAOJ fellow (2012/04 – 2017/03)
Research Assistant Professor (2011/09 – 2012/03)
2006 – 2011 **NASA Goddard Space Flight Center**, Greenbelt, MD, USA
Visiting research scientist, University of Maryland Baltimore County (2010/04 – 2011/09)
NASA Postdoctoral Fellow (2007/04 – 2010/04)
Visiting research associate, University of Maryland Baltimore County (2006/11 – 2007/04)
2006 – 2007 **Japan Aerospace Exploration Agency**, Sagamihara, Japan
Researcher, Institute of Space and Astronautical Science (2006/04 – 2007/03)

Awards
2011/11/5 Ohbayashi Early Carrier Scientist Award by *Society of Geomagnetism and Earth, Planetary and Space Sciences (**SGEPSS**)*
2015/2/20 Excellent reviewer award in 2014 by *Earth, Planets and Space*
2016/4/21 Young Scientists' Prize by *the Minister of Education, Culture, Sports, Science and Technology*
2018/5/23 Tanakadate Award by *Society of Geomagnetism and Earth, Planetary and Space Sciences*

Professional services
Membership *Society of Geomagnetism and Earth, Planetary and Space Sciences* (***SGEPSS***), American Geophysical Union, European Geosciences Union, Astronomical Society of Japan
Review Astronomy & Astrophysics, Astrophysical Journal, Astrophysical Journal Letters, Astrophysical Journal Supplement Series, Astrophysics and Space Science Library, Earth Planets and Space, Geophysical Research Letters, Journal of Geophysical Research: Space Physics, Monthly Notices of the Royal Astronomical Society, Nature Communications, *Nature Physics*, New Journal of Physics, Nonlinear Processes in Geophysics, Physica Scripta, Physical Review E, *Physical Review Letters*, Physics of Plasmas, Plasma and Fusion Research, Plasma Science and Technology, Reviews of Modern Plasma Physics, *Science*, Solar Physics, Space Science Reviews, National Science Foundation, Department of Energy, NASA Earth and Space Science Fellowship, Japan Society for the Promotion of Science (KAKENHI), Chilean National Science and Technology Commission
Editor Earth Planets and Space (2021/01-2024/12)

Publications

Refereed journals (first author)

1. **S. Zenitani** & M. Hoshino, *The Generation of Nonthermal Particles in Relativistic Magnetic Reconnection of Pair Plasmas*, Astrophys. J. Lett., 562, L63 (2001)
2. **S. Zenitani** & M. Hoshino, *Relativistic Particle Acceleration in a Folded Current Sheet*, Astrophys. J. Lett., 618, L111 (2005)
3. **S. Zenitani** & M. Hoshino, *Three-Dimensional Evolution of a Relativistic Current Sheet: Triggering of Magnetic Reconnection by the Guide Field*, Physical Review Letters, 95, 095001 (2005)
4. **S. Zenitani** & M. Hoshino, *Particle Acceleration and Magnetic Dissipation in Relativistic Current Sheet of Pair Plasmas*, Astrophys. J., 670, 702 (2007)
5. **S. Zenitani** & M. Hoshino, *The Role of the Guide Field in Relativistic Pair Plasma Reconnection*, Astrophys. J., 677, 530 (2008)
6. **S. Zenitani** & M. Hesse, *The role of the Weibel instability at the reconnection jet front in relativistic pair plasma reconnection*, Physics of Plasmas, 15, 022101 (2008)
7. **S. Zenitani** & M. Hesse, *Self-regulation of the Reconnecting Current Layer in Relativistic Pair Plasma Reconnection*, Astrophys. J., 684, 1477 (2008)
8. **S. Zenitani**, M. Hesse, & A. Klimas, *Two-fluid Magnetohydrodynamic Simulations of Relativistic Magnetic Reconnection*, Astrophys. J., 696, 1385 (2009)
9. **S. Zenitani**, M. Hesse, & A. Klimas, *Relativistic Two-fluid Simulations of Guide Field Magnetic Reconnection*, Astrophys. J., 705, 907 (2009)
10. **S. Zenitani**, M. Hesse, & A. Klimas, *Scaling of the Anomalous Boost in Relativistic Jet Boundary Layer*, Astrophys. J., 712, 951 (2010)
11. **S. Zenitani**, M. Hesse, & A. Klimas, *Resistive Magnetohydrodynamic Simulations of Relativistic Magnetic Reconnection*, Astrophys. J. Lett., 716, L214 (2010)
12. **S. Zenitani** & T. Miyoshi, *Magnetohydrodynamic structure of a plasmoid in fast reconnection in low beta plasmas*, Physics of Plasmas, 18, 022105 (2011)
13. **S. Zenitani**, M. Hesse, A. Klimas, & M. Kuznetsova, *New Measure of the Dissipation Region in Collisionless Magnetic Reconnection*, Physical Review Letters, 106, 195003 (2011)
14. **S. Zenitani**, M. Hesse, A. Klimas, C. Brack, & M. Kuznetsova, *The inner structure of collisionless magnetic reconnection: The electron-frame dissipation measure and Hall fields*, Physics of Plasmas, 18, 122108 (2011)
15. **S. Zenitani**, I. Shinohara, & T. Nagai, *Evidence for the dissipation region in magnetotail reconnection*, Geophys. Res. Lett., 39, L11102 (2012)
16. **S. Zenitani**, I. Shinohara, T. Nagai, & T. Wada, *Kinetic aspects of the ion current layer in a reconnection outflow exhaust*, Physics of Plasmas, 20, 092120 (2013)
17. **S. Zenitani** & T. Umeda, *Some remarks on the diffusion regions in magnetic reconnection*, Physics of Plasmas, 21, 034503 (2014)
18. **S. Zenitani**, *Magnetohydrodynamic structure of a plasmoid in fast reconnection in low beta plasmas: Shock-shock interactions*, Physics of Plasmas, 22, 032114 (2015)
19. **S. Zenitani**, *Loading Relativistic Maxwell Distributions in Particle Simulations*, Physics of Plasmas, 22, 042116 (2015)
20. **S. Zenitani** & T. Nagai, *Particle dynamics in the electron current layer in collisionless magnetic reconnection*, Physics of Plasmas, 23, 102102 (2016)
21. **S. Zenitani**, H. Hasegawa, & T. Nagai, *Electron dynamics surrounding the X line in asymmetric magnetic reconnection*, Journal of Geophysical Research: Space Physics, 122, 7396 (2017)
22. **S. Zenitani**, *Dissipation in relativistic pair-plasma reconnection: revisited*, Plasma Physics and Controlled Fusion, 60, 014028 (2018)
23. **S. Zenitani** & T. Umeda, *On the Boris solver in particle-in-cell simulation*, Physics of Plasmas, 25, 112110 (2018)
24. **S. Zenitani** & T. N. Kato, *Multiple Boris integrators for particle-in-cell simulation,* Comput. Phys. Commun., 247, 106954 (2020)
25. **S. Zenitani** & T. Miyoshi, *Plasmoid-dominated Turbulent Reconnection in a Low-β Plasma,* Astrophys. J. Lett., 894, L7 (2020)
26. **S. Zenitani** & S. Nakano, *Loading a relativistic Kappa distribution in particle simulations,* Physics of Plasmas, 29, 113904 (2022)
27. **S. Zenitani** & S. Nakano, *Loading loss-cone distributions in particle simulations,* Journal of Geophysical Research: Space Physics, 128, e2023JA031983 (2023)
28. **S. Zenitani**, *Modifications to Swisdak (2013)'s rejection sampling algorithm for a Maxwell-Jüttner distribution in particle simulations*, Physics of Plasmas, 31, 094501 (2024)
29. **S. Zenitani**, *A gamma variate generator with shape parameter less than unity*, Economics Bulletin, 44, 1113 (2024), arXiv:2411.01415
30. **S. Zenitani** & T. N. Kato, *Hyper Boris integrators for kinetic plasma simulations,* Comput. Phys. Commun., 315, 109695 (2025)

Refereed journals (coauthor)

31. M. Hesse & **S. Zenitani**, *Dissipation in relativistic pair-plasma reconnection*, Physics of Plasmas, 14, 112102 (2007)
32. A. Klimas, M. Hesse, & **S. Zenitani**, *Particle-in-cell simulation of collisionless reconnection with open outflow boundaries*, Physics of Plasmas, 15, 082102 (2008)
33. M. Hesse, **S. Zenitani**, & A. Klimas, *The structure of the electron outflow jet in collisionless magnetic reconnection*, Physics of Plasmas, 15, 112102 (2008)
34. M. Hesse, **S. Zenitani**, M. Kuznetsova, & A. Klimas, *A simple, analytical model of collisionless reconnection in a pair plasma*, Physics of Plasmas, 16, 102106 (2009)
35. A. Klimas, M. Hesse, **S. Zenitani**, & M. Kuznetsova, *Particle-in-cell simulation of collisionless driven reconnection with open boundaries*, Physics of Plasmas, 17, 112904 (2010)
36. M. Hesse, T. Neukirch, K. Schindler, M. Kuznetsova, & **S. Zenitani**, *The Diffusion Region in Collisionless Magnetic Reconnection*, Space Science Reviews, 106, 3 (2011)
37. M. Hesse, J. Birn, & **S. Zenitani**, *Magnetic reconnection in a compressible MHD plasma*, Physics of Plasmas, 18, 042104 (2011)
38. J. Birn, M. Hesse, & **S. Zenitani**, *Reconnection in compressible plasmas: Extended conversion region*, Physics of Plasmas, 18, 111202 (2011)
39. A. Klimas, M. Hesse, & **S. Zenitani**, *Particle-in-cell simulation of collisionless undriven reconnection with open boundaries*, Physics of Plasmas, 19, 042901 (2012)
40. N. Aunai, M. Hesse, **S. Zenitani**, M. Kuznetsova, C. Black, R. Evans, & R. Smets, *Comparison between hybrid and fully kinetic models of asymmetric magnetic reconnection: coplanar and guide field configurations*, Physics of Plasmas, 20, 022902 (2013)
41. T. Nagai, I. Shinohara, **S. Zenitani**, R. Nakamura, T. Nakamura, M. Fujimoto, Y. Saito, & T. Mukai, *Three-dimensional structure of magnetic reconnection in the magnetotail from Geotail observations*, Journal of Geophysical Research, 118, 1667 (2013)
42. M. Hesse, N. Aunai, **S. Zenitani**, M. Kuznetsova, & J. Birn, *Aspects of collisionless magnetic reconnection in asymmetric systems*, Physics of Plasmas, 20, 061210 (2013)
43. H. Baty, J. Pétri, & **S. Zenitani**, *Explosive reconnection of double tearing modes in relativistic plasmas: application to the Crab flares*, MNRAS Letters, 436, L20 (2013)
44. T. Nagai, **S. Zenitani**, I. Shinohara, R. Nakamura, M. Fujimoto, Y. Saito, & T. Mukai, *Ion and electron dynamics in the ion-electron decoupling region of magnetic reconnection with Geotail observations*, Journal of Geophysical Research, 118, 7703 (2013)
45. J. Pétri, M. Takamoto, H. Baty, & **S. Zenitani**, *Explosive reconnection of the double tearing mode in relativistic plasmas with application to the Crab flares*, Plasma Physics and Controlled Fusion, 57, 014034 (2015)
46. T. Nagai, I. Shinohara, & **S. Zenitani**, *Ion acceleration processes in magnetic reconnection: Geotail observations in the magnetotail*, Journal of Geophysical Research, 120, 1766 (2015)
47. T. Nagai, I. Shinohara, & **S. Zenitani**, *The dawn-dusk length of the X line in the near-Earth magnetotail: Geotail survey in 1994-2014*, Journal of Geophysical Research, 120, 8762 (2015)
48. M. Hesse, N. Aunai, J. Birn, P. Cassak, R. E. Denton, J. F. Drake, T. Gombosi, M. Hoshino, W. Matthaeus, D. Sibeck, & **S. Zenitani**, *Theory and Modeling for the Magnetospheric Multiscale Mission*, Space Science Reviews, 199, 577 (2016)
49. H. Hasegawa, N. Kitamura, Y. Saito, T. Nagai, I. Shinohara, S. Yokota, C. Pollock, B. Giles, J. Dorelli, D. Gershman, L. Avanov, S. Kreisler, W. Paterson, M. Chandler, V. Coffey, J. Burch, R. Torbert, T. Moore, C. T. Russell, R. Strangeway, G. Le, M. Oka, T.-D. Phan, B. Lavraud, **S. Zenitani**, & M. Hesse (25th/26 author), *Decay of mesoscale flux transfer events during quasi-continuous spatially-extended reconnection at the magnetopause*, Geophysical Research Letters, 43, 4755 (2016)
50. T. K. M. Nakamura, S. Eriksson, H. Hasegawa, **S. Zenitani**, W. Li, K. Genestreti, R. Nakamura, & W. Daughton, *Mass and energy transfer across the Earth's magnetopause caused by the vortex-induced reconnection*, Journal of Geophysical Research, 122, 11505 (2017)
51. T. Shimizu, K. Kondoh, & **S. Zenitani**, *Numerical MHD study for plasmoid instability in uniform resistivity*, Physics of Plasmas, 24, 112117 (2017)
52. M. Hosseinpour, Y. Chen, & **S. Zenitani**, *On the effect of parallel shear flow on the plasmoid instability*, Physics of Plasmas, 25, 102117 (2018)
53. Y. Matsumoto, Y. Asahina, Y. Kudoh, T. Kawashima, J. Matsumoto, H. R. Takahashi, T. Minoshima, **S. Zenitani**, T. Miyoshi, & R. Matsumoto, *Magnetohydrodynamic Simulation Code CANS+: Assessments and Applications*, Publications of the Astronomical Society of Japan, 71, 83 (2019)
54. W.-L. Teh & **S. Zenitani**, *Thermodynamic Properties of Mirror Structures in the Magnetosheath: MMS Observations and Double-Polytropic MHD Simulations*, Astrophys. J., 885, 22 (2019)
55. W.-L. Teh & **S. Zenitani**, *Thermodynamics of Dipolarization Fronts of Magnetic Reconnection in Anisotropic Plasma: MMS Observations and Resistive Double-polytropic MHD Simulations*, Astrophys. J., 890, 114 (2020)

56. W.-L. Teh & **S. Zenitani**, *Two-Dimensional Reconstruction of a Time-Dependent Mirror Structure from Double-Polytropic MHD simulation*, Earth and Space Science, 8, e2020EA001449 (2021)
57. G. Ueno & **S. Zenitani**, *Relativistic Maxwellian mixture model*, Physics of Plasmas, 28, 122106 (2021)
58. T. K. M. Nakamura, W.-L. Teh, **S. Zenitani**, T. Umeda, M. Oka, H. Hasegawa, A. Veronig, & R. Nakamura, *Spatial and time scaling of coalescing multiple magnetic islands*, Physics of Plasmas, 30, 022902 (2023)
59. W.-L. Teh, T. K. M. Nakamura, **S. Zenitani**, T. Umeda, & R. Nakamura, *New aspects of energy conversion in magnetic island dynamics: particle-in-cell simulation of multiple island coalescence and MMS observations*, Astrophys. J, 947, 4 (2023)
60. S. Totorica, **S. Zenitani**, M. Machida, S. Matsukiyo, K. Sekiguchi, & A. Bhattacharjee, *Exact Calculation of Nonideal Fields Demonstrates Dominance of Injection in Relativistic Reconnection*, Astrophys. J. Lett., 752, L1 (2023)
61. S. Usami & **S. Zenitani**, *Three-dimensional crescent-shaped ion velocity distributions created by magnetic reconnection in the presence of a guide field*, Physics of Plasmas, 31, 022102 (2024)
62. F. Guo, Y.-H. Liu, **S. Zenitani**, & M. Hoshino, *Magnetic Reconnection and Associated Particle Acceleration in High-energy Astrophysics*, Space Science Reviews, 220, 43 (2024)
63. H. Hasegawa, M. R. Argall, N. Aunai, R. Bandyopadhyay, N. Bessho, I. J. Cohen, R. E. Denton, J. C. Dorelli, J. Egedal, S. A. Fuselier, P. Garnier, V. Genot, D. B. Graham, K. J. Hwang, Y. V. Khotyaintsev, D. B. Korovinskiy, B. Lavraud, Q. Lenouvel, T. C. Li, Y.-H. Liu, B. Michotte de Welle, T. K. M. Nakamura, D. S. Payne, S. M. Petrinec, Y. Qi, A. C. Rager, P. H. Reiff, J. M. Schroeder, J. R. Shuster, M. I. Sitnov, G. K. Stephens, M. Swisdak, A. M. Tian, R. B. Torbert, K. J. Trattner, & **S. Zenitani** (36th/36 author), *Advanced methods for analyzing in-situ observations of magnetic reconnection*, Space Science Reviews, 220, 68 (2024)
64. R. Nakamura, J. L. Burch, J. Birn, L. -J. Chen, D. B. Graham, F. Guo, K.-J. Hwang, H. Ji, Yu. V. Khotyaintsev, Y.-H. Liu, M. Oka, D. Payne, M. I. Sitnov, M. Swisdak, **S. Zenitani,** J. F. Drake, S. A. Fuselier, K. J. Genestreti, D. J. Gershman, H. Hasegawa, M. Hoshino, C. Norgren, M. A. Shay, J. R. Shuster, J. E. Stawarz (15th/25 author), *Outstanding questions and future research of magnetic reconnection,* Space Science Reviews, 221, 17 (2025)

Conference proceedings and other articles

65. **S. Zenitani** & M. Hoshino, *A plasma sheet as a source of non-thermal particles --- relativistic magnetic reconnection and relativistic drift kink instability in $e^{\pm}$ plasmas*, Proceedings of 28th International Cosmic Ray Conference, p. 2043 (2003)
66. M. Hoshino, **S. Zenitani**, K. Nagata, & Y. Takagi, *Particle Acceleration in Kinetic Plasma Processes*, Proceedings of Energy Budget in the High Energy Universe, p. 108 (2006)
67. **S. Zenitani**, M. Hesse, & A. Klimas, *Fluid and Magnetofluid Modeling of Relativistic Magnetic Reconnection*, AIP Conference Proceedings, 1366, 138 (2011)
68. M. Hesse, N. Aunai, M. Kuznetsova, **S. Zenitani**, & J. Birn, *Magnetic Reconnection in Different Environments: Similarities and Differences*, AGU Geophysical Monograph, 207, 259 (2015)
69. I. Shinohara, M. Fujimoto, T. Nagai, **S. Zenitani**, & H. Kojima, *Low-frequency Waves in the Tail Reconnection Region*, AGU Geophysical Monograph, 216, 181 (2016)
70. M. Yamada, J. Yoo, & **S. Zenitani**, *Energy conversion and inventory of a prototypical magnetic reconnection layer*, Astrophysics and Space Science Library, 427, 143 (2016)

Articles in Japanese language

71. **S. Zenitani** & H. R. Takahashi, *New Trends of Reconnection Research: Relativistic Magnetic Reconnection*, J. Plasma Fusion Res., 89, 845 (2013)
72. S. Usami & **S. Zenitani**, *Problems and Future of Reconnection Research: Problems and Future of Simulation Studies*, J. Plasma Fusion Res., 89, 861 (2013)
73. **S. Zenitani**, *Magnetohydrodynamic (MHD) simulations of magnetic reconnection with a high-resolution shock-capturing code*, Sustainable humanosphere, 13, 27 (2017)
74. **S. Zenitani** & T. N. Kato, *Numerical methods for charged particles in relativistic particle-in-cell simulation*, Sustainable humanosphere, 14, 62 (2018)
75. **S. Zenitani**, *Recent progress in particle orbit theory of magnetic reconnection*, J. Plasma Fusion Res., 97, 47 (2021)
76. R. Chen, T. Takeyama, **S. Zenitani**, S. Tachibana, & A. Iizuka, *Depth distribution estimation of over consolidation ratio by machine learning*, Report of Research Center for Urban Safety and Security, 25, 33 (2021)
77. T. Dogahara, T. Takeyama, **S. Zenitani**, S. Tachibana, & A. Iizuka, *GPU parallelization of geotechnical response analysis code*, Report of Research Center for Urban Safety and Security, 26, 10 (2022)
78. N. Deguchi, **S. Zenitani**, Y. Nashita, & H. Masutani, *Table detection in highway completion drawings using an object-detection algorithm YOLOv5*, Report of Research Center for Urban Safety and Security, 26, 20 (2022)
79. Y. Nashita & **S. Zenitani**, *The study of element extraction in drawing using image recognition technology by SSD algorithm,* Kansai Geo-Symposium 2022, 91-96 (2022)

80. **S. Zenitani**, *Numerical methods for kappa distributions in particle-in-cell simulations*, J. Plasma Fusion Res., 101, 380 (2025)
81. 地球電磁気・地球惑星圏学会「地球電磁気学・地球惑星圏科学の現状と将来 (2013,2018,2019,2022,2023,2024)」編集・執筆協力

Invited talks (international)

1. *Particle acceleration and magnetic dissipation processes in the plasma sheets of relativistic pair plasmas*, US-Japan Workshop on Magnetic Reconnection (MR2007), Maryland, March 2007
2. *On the current sheet thickness in relativistic pair plasma reconnection*, Cambridge Workshop on Magnetic Reconnection, Maryland, September 2007
3. *On the outflow region of relativistic pair plasma reconnection*, Cambridge Workshop on Magnetic Reconnection, Maryland, September 2007
4. *The role of the Weibel instability at the reconnection jet front in relativistic pair plasma reconnection*, US-Japan Workshop on Magnetic Reconnection (MR2008), Okinawa, Japan, March 2008
5. *Current sheet expanding processes in relativistic pair plasma reconnection*, Cambridge conference 2008, Bohn, Germany, August 2008
6. *Relativistic current sheets in electron-positron plasmas*, Cracow conference 2008, Krakow, Poland, October 2008
7. *Relativistic two-fluid simulations of pair plasma reconnection*, International Cambridge workshop on magnetic reconnection 2009, Fairbanks, AL, USA, August 2009
8. *Two-fluid simulations of relativistic magnetic reconnection in pair plasmas*, US-Japan Workshop on Reconnection (MR2009), Madison, WI, USA, October 2009
9. *Two-Fluid Simulations of Relativistic Magnetic Reconnection in Electron-Positron Plasmas*, Yosemite Workshop on Magnetic Reconnection, Yosemite, California, USA, February 2010
10. *Resistive Magnetohydrodynamic Simulations of Relativistic Magnetic Reconnection*, International Cambridge Workshop on Magnetic Reconnection 2010, St. Andrews, UK, August 2010
11. *Fluid and Magnetofluid Modeling of Relativistic Magnetic Reconnection*, UAH (University of Alabama Huntsville) Workshop 2010, Nashville, Tennessee, USA, October 2010
12. *Resistive Magnetohydrodynamic Simulations of Relativistic Magnetic Reconnection*, US-Japan Workshop on Magnetic Reconnection (MR2010), Nara, Japan, December 2010
13. *Numerical Simulations of Relativistic Magnetic Reconnection*, Magnetic Reconnection in Relativistic Wind Workshop, SLAC National Accelerator Laboratory, CA, USA, April 2011
14. *The electron-frame dissipation measure in collisionless magnetic reconnection*, International Cambridge Workshop on Magnetic Reconnection 2011, Durham, New Hampshire, USA, August 2011
15. *A new measure of the dissipation region in collisionless magnetic reconnection*, Computational Methods in High Energy Density Plasmas - Workshop II: Computational Challenges in Magnetized Plasma, Los Angeles, USA, April 2012
16. *A new measure of the dissipation region in collisionless magnetic reconnection: Theory, simulation, and observation*, US-Japan Workshop on Magnetic Reconnection (MR2012), Princeton, USA, May 2012
17. *Geotail observation of the dissipation region in collisionless magnetic reconnection*, AOGS - AGU (WPGM) Joint Assembly, Singapore, August 2012
18. *Evidence for the dissipation region in magnetotail reconnection*, International Cambridge Workshop on Magnetic Reconnection 2012, Copenhagen, Denmark, August 2012
19. *The structure of the dissipation region in collisionless magnetic reconnection: Theory, Simulation, and Observation*, GEOTAIL 20th Anniversary Workshop 2012, Tokyo, November 2012
20. *Identification of the dissipation region in collisionless magnetic reconnection: Theory and Simulations*, AGU Fall meeting 2012, San Francisco, USA, December 2012
21. *Magnetic diffusion and ion nonlinear dynamics in magnetic reconnection*, The 11th International School / Symposium for Space Simulations (ISSS-11), National Central University, Taiwan, July 2013
22. *Magnetic diffusion and ion nonlinear dynamics in magnetic reconnection*, ISAS Workshop: Magnetospheric Plasmas, Tokyo, Japan, November 2013
23. *The structure of the diffusion region in collisionless reconnection: Theory, simulation, and observation*, Parker reconnection Workshop, Sao Jose dos Campos, Brazil, March 2014
24. *Magnetic diffusion and ion nonlinear dynamics in magnetic reconnection*, US-Japan Workshop on Magnetic Reconnection (MR2014), Tokyo, Japan, May 2014
25. *The structure of the diffusion region in magnetic reconnection*, AOGS 11th Annual Meeting, Sapporo, Japan, July 2014
26. *A new picture of the central engine of kinetic magnetic reconnection*, The 6th East-Asian Numerical Astrophysicists Meeting, Kyoung-Hee University, Suwon, Korea, September 2014
27. *Numerical Modeling of Relativistic Reconnection: Kinetic, Two-fluid, and MHD Simulations*, The Evolving Blazar Paradigm meeting, Krakow, Poland, April 2015

28. *Particle acceleration in relativistic magnetic reconnection*, AOGS 12th Annual Meeting, Singapore, August 2015
29. *High-speed fluid dynamics in magnetic reconnection in a low-beta plasma*, Chapman Conference on Magnetospheric Dynamics, Fairbanks, Alaska, USA, September 2015
30. *Particle dynamics and nongyrotropic distribution functions in collisionless magnetic reconnection*, International GEMSIS and ASINACTR-G2602 Workshop, Nagoya, March 2016
31. *The structure of the diffusion region in collisionless magnetic reconnection: Theory, simulation, and observation*, Dynamical Processes in Space Plasmas, Dead Sea, Israel, April 2016
32. *Dissipation in relativistic pair-plasma reconnection: revisited*, Purdue Workshop on Relativistic Plasma Astrophysics, Purdue, USA, May 2016
33. *Electron particle dynamics in collisionless magnetic reconnection*, US-Japan Workshop and School on Magnetic Reconnection (MR2017), Matsuyama, Japan, Mar 2017
34. *Advances in numerical modeling of relativistic magnetic reconnection*, 2017 European Physical Society - Plasma Physics Conference, Belfast, UK, June 2017
35. *Electron particle dynamics in collisionless magnetic reconnection*, 7th East-Asia School and Workshop on Laboratory, Space, and Astrophysical Plasmas (EASW-7), Weihai, China, July 2017
36. *Electron particle dynamics in collisionless magnetic reconnection*, IAPSO-IAMAS-IAGA scientific assembly, Cape Town, South Africa, August 2017
37. *Electron particle dynamics in collisionless magnetic reconnection*, AAPPS-DPP2017 1st Asia-Pacific Conference on Plasma Physics, Chengdu, China, September 2017
38. *Electron dynamics surrounding the X line in asymmetric magnetic reconnection*, Fundamental Physical Processes in Solar-Terrestrial Research and Their Relevance to Planetary Physics, Kona, Hawaii, January 2018
39. *Electron Particle Dynamics in Collisionless Magnetic Reconnection*, The 13th International School / Symposium for Space Simulations (ISSS-13), UCLA, Los Angeles, September 2018
40. *Electron physics near the X-line in asymmetric magnetic reconnection*, 2nd Asia-Pacific Conference on Plasma Physics (AAPPS-DPP2018), Kanazawa, Japan, November 2018
41. *Reconnecting the dots: Particle dynamics in magnetic reconnection*, Max-Planck Princeton Center for Plasma Physics (MPPC) Workshop 2019, Tokyo, Japan, February 2019
42. *Asymmetric magnetic reconnection at the dayside magnetopause*, 9th East-Asia School and Workshop on Laboratory, Space, and Astrophysical Plasmas, Nagoya, Japan, July 2019
43. *Boris-type particle solvers in particle-in-cell (PIC) simulation*, 3rd Asia-Pacific Conference on Plasma Physics (AAPPS-DPP2019), Hefei, China, November 2019
44. *Identification of the Electron Diffusion Region in Collisionless Magnetic Reconnection*, AOGS 17th Annual Meeting, Hongcheon, Korea, June 2020 (meeting was cancelled)
45. *Issues in kinetic modeling of relativistic magnetic reconnection*, 3rd Asia-Pacific Conference on Plasma Physics (AAPPS-DPP2020), Online, October 2020
46. *Particle dynamics in collisionless magnetic reconnection*, International Conference on High Energy Density Sciences 2021 (HEDS2021), Online, April 2021
47. *Particle dynamics and nongyrotropic velocity distribution functions in magnetic reconnection*, International Workshop on Magnetic Reconnection 2021 (2021 年磁场重联国际研讨会), Weihai+Online, China, July 2021
48. *Plasmoid-dominated turbulent reconnection in symmetric and asymmetric systems*, US-Japan Workshop on Magnetic Reconnection (MR2022), Monterey, USA, May 2022
49. *Getting started with MHD simulations*, The 14th International School/Symposium for Space Simulations (ISSS-14), Online/Kobe, Japan, September 2022
50. *Hyper Boris integrators for particle-in-cell simulations*, NINS International Research Collaboration Center Astro-fusion Plasma Physics (IRCC-AFP) meeting, Mitaka, Japan, October 2022
51. *Hyper Boris solvers for kinetic plasma simulations*, US-Japan Workshop on Magnetic Reconnection (MR2023), Ise, Japan, June 2023
52. *Some topics on a relativistic Kappa distribution*, Electron Kinetic Physics: The Next Frontier in Space and Astrophysical Plasmas, Bern, Switzerland, April 2024
53. *Particle dynamics in collisionless magnetic reconnection*, 3rd International Fusion and Plasma Conference (iFPC 2024), Seoul, South Korea, June 2024
54. *Numerical Algorithms for Generating Loss-cone Distributions in Particle Simulation*, AOGS 21st Annual Meeting, Pyongchang, South Korea, June 2024
55. *Magnetohydrodynamic (MHD) simulations*, The 15th International School/Symposium for Space Simulations (ISSS-15) & the 16th International Workshop on the Interrelationship between Plasma Experiments in Laboratory and Space (IPELS-16), Munich, Germany, August 2024
56. *Recent advances in numerical algorithms for particle-in-cell simulation*, US-Japan Workshop on Magnetic Reconnection (MR2025), Princeton, USA, March 2025
57. *Electron Energy Partition during Magnetic Reconnection*, Joint Cluster-Plasma Observatory workshop, Paris, France, October 2025

Invited talks (domestic/Japanese)

1. 電子・陽電子プラズマシート中の高エネルギー粒子加速過程、STE シミュレーション研究会、名古屋大学、名古屋、2002/10
2. 相対論磁気リコネクションのシミュレーション研究、STEL 研究会『磁気リコネクション研究の現状と展望 ---素過程から現象まで---』、名古屋大学、名古屋、2011/03
3. 相対論プラズマシミュレーション入門、SGEPSS 波動分科会研究会「一般相対論と MHD プラズマ」府中町屋倶楽部、武生、福井、2011/12
4. 磁気リコネクションのシミュレーション研究、日本天文学会春季年会、龍谷大学、京都、2012/03
5. 磁気拡散領域のジオテイル衛星観測、STEL/NINS 研究会「磁気リコネクション研究の現状と展望２」、愛媛大学、松山、2013/02
6. 無衝突磁気リコネクションの散逸領域、宇宙惑星プラズマ物理学研究の最前線　研究集会、東京大学、東京、2013/02
7. 相対論磁気リコネクション研究の現状、ブラックホール磁気圏勉強会、熊本大学、熊本、2014/03
8. Our present understanding of the diffusion region in collisionless magnetic reconnection、磁気リコネクションと太陽プラズマ研究会、京都大学東京オフィス、東京、2014/03
9. 相対論磁気リコネクション、宇宙プラズマ理論研究会、東北大学、仙台、2014/08
10. 磁気圏リコネクション研究の現状と MMS ミッションへの期待、GEMSIS ワークショップ 2014、名古屋大学、名古屋、2014/09
11. 無衝突磁気リコネクションの中心領域問題：理論・ シミュレーション・観測, STE 研究集会「波動粒子相互作用による粒子加速・輸送及び乱流」、名古屋大学、名古屋、2015/03
12. Particle acceleration in magnetic reconnection、CTA 研究会「高エネルギーガンマ線でみる極限宇宙 2015」、宇宙線研究所、柏、2016/01
13. Particle dynamics in the electron current layer in collisionless magnetic reconnection、磁気リコネクション研究の最前線と今後の展望、国立天文台、三鷹、2016/03
14. MMS 衛星の観測成果と磁気圏リコネクションの運動論物理、実験室宇宙・天体プラズマ物理学に関する研究集会、九州大学筑紫キャンパス、福岡、2018/08
15. 無衝突磁気リコネクションにおける粒子運動ダイナミクス、高エネルギー宇宙物理学研究会 2018、東京大学、東京、2018/09
16. 新しいアプローチの導入による磁気リコネクションのミクロ構造の解明、地球電磁気・地球惑星圏学会 田中館賞受賞記念講演会、名古屋大学、名古屋、2018/11
17. プラズモイド型乱流磁気リコネクションの MHD シミュレーション研究、プラズマシミュレーターシンポジウム 2021、核融合科学研究所、オンライン、2021/09
18. 宇宙・太陽・天体プラズマにおける粒子加速研究の将来構想、第 150 回地球電磁気・地球惑星圏学会講演会、オンライン、2021/11
19. 乱流磁気リコネクションのシミュレーション研究と GPU 時代の展望、ISEE 研究集会「太陽地球圏環境予測のためのモデル研究の展望」、オンライン、2022/03
20. 磁気リコネクションにおけるプラズマ粒子軌道研究の進展、プラズマ・核融合学会、富山、2022/11

Meetings (Chair/SOC or LOC; International)

1. 12th International Workshop on the Interrelationship between Plasma Experiments in Laboratory and Space (IPELS), Hakuba Tokyu Hotel, Nagano, Japan, 2013/07/01-05 (LOC)
2. Japan Geoscience Union Meeting 2016, MMS international session, Chiba, Japan, 2016/05/22-26 (Main convener)
3. JpGU-AGU Joint Meeting 2017, MMS international session, Chiba, Japan, 2017/05/20-25 (Convener)
4. JpGU-AGU Joint Meeting 2020, Plasma theory & simulation international session, Chiba, Japan, 2020/07/12-16 (Main convener)
5. UJI Reconnection Workshop 2020, Online, 2020/11/05 (Chair)
6. 9th VERSIM Workshop, Online, Japan 2020/11/21-25 (LOC)
7. US-Japan Workshop on Magnetic Reconnection (MR2023), Ise, Japan, 2023/06/26-29 (LOC)
8. UJI Reconnection Workshop 2024, Online, 2024/06/11-13 (Chair)
9. EGU General Assembly 2025, ST reconnection session, Vienna, Austria, 2025/04/27-05/02 (Convener)
10. AAPPS-DPP International Organizing Committee, 2024~
11. AAPPS-DPP *Plasma Simulation, Diagnostics and Data Science* section, Program Committee, 2025~

Meetings (Chair/SOC or LOC; Domestic)

12. 自然科学研究機構「自然科学における階層と全体」シンポジウム、安保ホール、名古屋、2012/02/10-11 (Chair)

13. NINS/UT Workshop on Magnetic Reconnection 2012、学術総合センター、東京都千代田区、2012/02/19-20 (Chair)
14. プラズマ研究会、多摩スポーツセンター、川崎市、2013/01/13-15 (LOC)
15. 第２回 DTA シンポジウム「コンパクト天体の活動性と磁気的性質」、国立天文台、三鷹、2014/10/27-29 (世話人; co-chair)
16. 理論天文学研究会 2014、休暇村館山、千葉県館山市、2014/11/10-12 (世話人)
17. 「宇宙プラズマのフロンティア」研究会、名古屋大学、名古屋、2016/03/02-04 (LOC)
18. 地球電磁気・地球惑星圏学会 講演会、磁気圏セッションコンビーナ、2016-2019 年度
19. 第 142 回地球電磁気・地球惑星圏学会講演会、京都大学、宇治、2017/10/15-19 (LOC)
20. 宇治リコネクションワークショップ 2017、京都大学、宇治、2017/10/20 (世話人)
21. 宇治リコネクションワークショップ 2018、名古屋大学、名古屋、2018/11/28 (世話人)
22. 宇治リコネクションワークショップ 2019、熊本大学、熊本、2019/10/22 (世話人)
23. DPP と IES を利用するためのデータ変換に関する実践的講習会、理化学研究所、神戸、2019/11/26-27 (LOC)
24. 第 148 回地球電磁気・地球惑星圏学会講演会、オンライン、2020/11/01-04 (LOC)
25. STE シミュレーション研究会・KDK シンポジウム合同研究会、オンライン、2021/03/29-31 (世話人)
26. 第 150 回地球電磁気・地球惑星圏学会講演会、オンライン、2021/11/01-04 (LOC)
27. 第 152 回地球電磁気・地球惑星圏学会講演会、３学会合同セッションコンビーナ、2022/11/01-04

Spacecraft missions

1. NASA Magnetospheric MultiScale (MMS) mission, Theory & Modeling Team
2. ESA Plasma Observatory mission (plan), “GIANNI” (Numerical modeling) WG

Public outreach (in Japanese)

1. 「宇宙プラズマ物理入門：磁気リコネクション研究の現状」朝日カルチャーセンター横浜教室、2015/4/20
2. 「大切なものは目に見えない～地球の裏庭で診る爆発現象」全国同時七夕講演会、筑波技術大学、2015/8/9
3. 「太陽活動と磁力線」星と宇宙の日、国立天文台、2015/10/24
4. 「宇宙空間の爆発現象：磁気リコネクション」広島大学附属高校 先端科学研修、神戸大学六甲キャンパス、2022/9/17

Contribution to broader society: Software development

1. OpenMHD, a Godunov-type code for ideal/resistive magnetohydrodynamics (MHD) (2010-)
   https://sci.nao.ac.jp/MEMBER/zenitani/openmhd-e.html
2. TeXShop, a TeX editor/previewer for Mac OS X (2002-2007)
   https://pages.uoregon.edu/koch/texshop/texshop.html
3. Carbon Emacs Package, a binary distribution of GNU Emacs for Mac OS X (2003-2010)
   https://sci.nao.ac.jp/MEMBER/zenitani/emacs-e.html
4. GNU Emacs, a UNIX text editor (2008)
   https://www.gnu.org/software/emacs/