Subash Adhikari

Postdoctoral Researcher – Department of Physics and Astronomy
West Virginia University (WVU), Morgantown, WV, 26506-6315

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Research Interests

Collisionless Plasma, Magnetic reconnection; Plasma Turbulence (Astrophysical, Laboratory); Kinetic simulations (particle-in-cell (PIC)); Magnetohydrodynamic (MHD) simulations, Data Analysis and Visualization.

Key Skills

1. Python, Fortran, IDL (basic) programming
2. Kinetic particle-in-cell (PIC) simulations (2D) (P3D and VPIC codes)
3. Magnetohydrodynamic (MHD) simulations (2D, 3D)
4. Experience of remote high-performance computing using supercomputers Derecho/Casper/Cheyenne at NCAR/UCAR and Cori/Perlmutter at NERSC

Education

Ph.D. (Physics) *Department of Physics and Astronomy, University of Delaware (UD)*
Dissertation: Interplay Between Magnetic Reconnection and Turbulence *2017-2022*
Advisor: Prof. Michael A. Shay
Graduated Term: ***Fall 2022***

M.S. (Physics) *Central Department of Physics, Tribhuvan University*
Thesis: A Study of Geodesics in Schwarzschild De-Sitter Spacetime *2011-2013*
Advisor: Prof. Udayraj Khanal

B.S. (Physics and Mathmematics) *St. Xavier's College, Tribhuvan University*
First Rank with Distinction among all B.S. and B. Tech. graduates *2007-2010*

Professional Experience

Postdoctoral Researcher, WVU *08/29/2022 - Present*
Perform kinetic PIC simulations of magnetic reconnection, turbulence using VPIC.
Mentor graduate students
Assist with the grant application and surveys

Graduate Research Assistant, UD *06/01/2019 - 08/28/2022*
Perform kinetic PIC simulations of magnetic reconnection (2D), MHD simulations of turbulence (2D, 3D)
Analyze data from kinetic and MHD simulations and compile results for publications
Assist with the grant application and surveys

Graduate Teaching Assistant, UD *08/29/2017 - 05/31/2019*
Taught Physics for undergraduate students majoring life sciences, physical sciences, and engineering
Received an Instructor rating of 4.768 *out of* 5.0 *(Source: Course Evaluation)*
Nominated for the Outstanding Teaching Assistant Award

High School Teacher (Physics and Mathematics) *03/15/2013-05/15/2017*
Lectured Physics and Mathematics at Budhanilkantha School (A-levels), Ed-Mark College, and Jyoti Academy

Graduate Teaching Assistant, Tribhuvan University *04/01/2012 - 02/01/2013*
Lectured on theoretical aspects of "General relativity and Cosmology" for graduate students

Publications

1. "Scale Filtering Analysis of Collisionless Reconnection and its Associated Turbulence", **S. Adhikari**, Y. Yang, W. H. Matthaeus, P. A. Cassak, T. N. Parashar, and M. A. Shay (2024), *Accepted for publications in Phys. of Plasmas*, doi:10.1063/5.0185132.
2. "Higher-order nonequilibrium term: Effective power density quantifying evolution towards or away from local thermodynamic equilibrium", M. H. Barbhuiya, P. A. Cassak, **S. Adhikari**, T. N. Parashar, H. Liang, M. R. Argall, Physical Review E 109, 015205 (2024), doi:10.1103/PhysRevE.109.015205.
3. "Using direct laboratory measurements of electron temperature anisotropy to identify the heating mechanism in electron-only magnetic reconnection", P. Shi, E. E. Scime, M. H. Barbhuiya, P. A. Cassak, **S. Adhikari**, M. Swisdak, and J. E. Stawarz (2023), Phys. Rev. Lett. 131, 155101, doi:10.1103/PhysRevLett.131.155101.
4. "Statistics of Pressure Fluctuations in Turbulent Kinetic Plasmas", **S. Adhikari**, M. A. Shay, T. N. Parashar, W. H. Matthaeus, and P. A. Cassak (2023), Monthly Notices of the Royal Astronomical Society, Volume 526, Issue 3, December, doi:10.1093/mnras/stad2871.
5. "Effect of a guide field on the turbulence like properties of magnetic reconnection", **S. Adhikari**, M. A. Shay, T. N. Parashar, W. H. Matthaeus, P. S. Pyakurel, J. E. Stawarz, and J. P. Eastwood (2023), Physics of Plasmas, **30** 082904, doi:10.1063/5.0150929.
6. "Turbulent Energy Transfer and Proton-Electron Heating in Collisionless Plasmas", S. Roy, R. Bandyopadhyay, Y. Yang, T. N. Parashar, W. H. Matthaeus, **S. Adhikari**, A. Chasapis, Hui Li, D. J. Gershman, B. L. Giles, and J. L. Burch (2022), The Astrophysical Journal, **941** 137, doi:10.3847/1538-4357/aca479.
7. "Strategies for determining the cascade rate in MHD turbulence: isotropy, anisotropy, and spacecraft sampling", Y. Wang, R. Chhiber, **S. Adhikari**, Y. Yang, R. Bandyopadhyay, M. A. Shay, S. Oughton, W. H. Matthaeus, and M. E. Cuesta (2022), The Astrophysical Journal, **937** 76, doi:10.3847/1538-4357/ac8f90.
8. "Energy Transfer in Reconnection and Turbulence", **S. Adhikari**, T. N. Parashar, M. A. Shay, W. H. Matthaeus, P. Sharma Pyakurel, S. Fordin, J. E. Stawarz, J. P. Eastwood (2021), Physical Review E, **104**, 065206, doi:10.1103/PhysRevE.104.065206.
9. "Reconnection from a turbulence perspective", **S. Adhikari**, M. A. Shay, T. N. Parashar, P. Sharma Pyakurel, W. H. Matthaeus, D. Godzieba, J. E. Stawarz, J. P. Eastwood, J. T. Dahlin (2020), Physics of Plasmas, **27**, 042305, doi:10.1063/1.5128376.

Presentations

Oral

(Invited talks in bold)

1. "**Kinetic Reconnection and Associated Turbulence: A Scale Filtering Approach**", **S. Adhikari**, Y. Yang, W. H Matthaeus, P. Cassak, T. N. Parashar, and M. A. Shay, MMS Fall SWT Meeting, University of Maryland, College Park, October 2023.
2. "**Analyzing Reconnection From a Turbulence Standpoint**", **S. Adhikari**, M. A. Shay, T. N. Parashar, W. H. Matthaeus, P. S. Pyakurel, J. E. Stawarz, and J. P. Eastwood, 44^{th} Scientific Assembly of the Committee on Space Research (COSPAR), July 16-24, 2022.
3. "**A Fundamental Connection Between Reconnection and Turbulence**", Magnetospheric Online Seminar Series, May 23, 2022.
4. "Reconnection and Turbulence: A Qualitative Approach to their Relationship", **S. Adhikari**, et. al., European Geosciences Union (EGU) General Assemby, Vienna, Austia, May 23-27, 2022.
5. **"Reconnection as a Cascade"**, **S. Adhikari**, et. al., US-Japan Workshop on Magnetic Reconnection 2022 (MR2022), Monetery, CA, May 16-20, 2022.
6. "Von Kaŕmań Analysis of Standard Reconnection using Particle-In-Cell (PIC) Simulation", **S. Adhikari**, et. al., Magnetospheri Multiscale Mission (MMS) Science Working Team (SWT) Tag-Up (Virtual), January 11, 2022.
7. "Reconnection as a Turbulence Process", **S. Adhikari**, M. A. Shay et. al., MMS Spring 2021 SWT Meeting, April 25-9, 2021.
8. "Reconnection as an Energy Cascade", **S. Adhikari**, M. A. Shay, W. H. Matthaeus, T.N. Parashar, AGU Fall Meeting (Online Everywhere), December 1-17, 2020.
9. **"Energy Cascade in Reconnection: 3rd Order Dynamics"**, **S. Adhikari**, et al., virtual MMS Fall 2020 Science Working Team Meeting, October 6-8, 2020.
10. "Is Reconnection a Cascade Process?", **S. Adhikari**, et al., virtual Geospace Environment Modelling (vGEM), July 20-23, 2020.
11. **"Interplay Between Magnetic Reconnection and Turbulence"**, **S. Adhikari**, et al., Laboratory of Atmospheric and Space Physics (LASP) Turbulence Bi-weekly Meeting (Online), July 20, 2020.
12. **"Reconnection from a Turbulence Perspective"**, **S. Adhikari**, et al. NASA Monday Science Telecon, August 26, 2019.

13. "Reconnection from a Turbulence Perspective", **S. Adhikari**, M.A. Shay, T. Parashar, P. Sharma, W.H. Matthaeus, D. Godzeiba. J. Dahlin, Geospace Environment Modeling (GEM), Santa Fe, USA, June 2019.

Poster

1. Poster: "Scale Filtering Analysis of Collisionless Reconnection and its Associated Turbulence", **S. Adhikari**, Y. Yang, W. H Matthaeus, P. Cassak, T. N. Parashar, and M. A. Shay, AGU Fall Meeting, San Fransisco, December 2023.
2. Poster: "Electron to Ion Scale Transition of Energy and Entropy Conversion In Kinetic Turbulence", **S. Adhikari**, P. A. Cassak, M. H. Barbhuiya, T. N. Parashar, and M. A. Shay, Solar Heliospheric and INterplanetary Environment (SHINE), Stowe, Vermont, August 2023.
3. Poster: "Mechanical and Total Pressure Statistics in Vlasov-Maxwell Plasmas", **S. Adhikari**, P. A. Cassak, T. N. Parashar, W. H. Matthaeus, and M. A. Shay, European Geosciences Union (EGU) General Assembly, Vienna, Austria, April 23-28, 2023.
4. Poster: "Statistics of Total Pressure in Kinetic Plasma Turbulence", **S. Adhikari**, M. A. Shay, T. N. Parashar, W. H. Matthaeus, and P. A. Cassak, AGU Fall Meeting, Chicago, December 12-16, 2022.
5. Poster:" Guide field dependence of energy spectrum and energy transfer in reconnection", **S. Adhikari** et al., Solar Heliospheric and INterplanetary Environment (SHINE), Honolulu, Hawaii, June 2022.
6. Poster:" Guide field dependence of energy spectrum and energy transfer in reconnection", **S. Adhikari** et al., Solar Heliospheric and INterplanetary Environment (SHINE), Honolulu, Hawaii, June 2022.
7. Poster:" Effect of a guide field on the turbulence-like properties of magnetic reconnection", **S. Adhikari** et al., Geospace Environment Modeling (GEM), Honolulu, Hawaii, June 2022.
8. Poster: "Beta Dependence of Kinetic Plasma Turbulence and Reconnection Across Scales", **S. Adhikari**, et. al., AGU Fall Meeting, New Orleans, December 13-17, 2021.
9. Poster: "Shear in Hall-MHD Turbulence: A Third-Order Analysis", **S. Adhikari**, et. al., Virtual Geospace Environment Modelling, July 25-30, 2021.
10. Poster: "Is Reconnection an Energy Cascade?", **S. Adhikari**, et al., virtual Geospace Environment Modelling (vGEM), July 20-23,2020.
11. Poster: "Reconnection from a turbulence perspective", **S. Adhikari**, et al., Delaware Data Science DARWIN Computing Symposium, University of Delaware (Newark, Delaware, USA), February 12, 2020.
12. Poster: "Magnetic Reconnection from a Turbulence Perspective", **S. Adhikari**, M.A. Shay, T. Parashar, P. Sharma, W.H. Matthaeus, D. Godzeiba. J. Dahlin, AGU Fall Meeting, San Francisco, USA, December 2019.
13. Poster: "Is laminar reconnection a turbulent process?", **S. Adhikari**, M.A. Shay, T. Parashar, P. Sharma, W.H. Matthaeus, D. Godzeiba. J. Dahlin, Geospace Environment Modeling (GEM), Santa Fe, USA, June 2019.

Services in International Committee

- Member of the ISSI Team "Unveiling Energy Conversion and Dissipation in Non-Equilibrium Space Plasmas" (2023).

Awards and Achievements

1. ***Qaisar and Monika Shafi Outstanding Dissertation Award***, Department of Physics and Astronomy, University of Delaware, May 2023.
2. ***Graduate Student Travel Award***, Graduate College, University of Delaware, October 2021.
3. ***Best Global System Modelling Poster***, Geospace Environment Modeling (GEM), Santa Fe, USA, June 2019.
4. ***Professional Development Award***, Office of Graduate and Professional Studies, University of Delaware, May 2019.
5. ***M.S. Thesis Grant***, Ministry of Science and Technology, Government of Nepal, 2013.
6. ***M.S. Fellowship***, Central Department of Physics, Tribhuvan University, Kathmandu, Nepal, 2011-2013.
7. ***Nepal Bidyabhusan Padak, "GA"*** awarded by the President of Nepal Dr. Ram Baran Yadav, 2011.
8. ***Excellence Award for Highest Marks in B.Sc.***, St. Xavier's College, Kathmandu, Nepal, 2010.

Professional Membership

- Member, American Physical Society (APS)
- Member, American Geophysical Union (AGU)
- Member, European Geosciences (EGU)
- Member, Committee on Space Research (COSPAR)

Peer Review

- Physics of Plasmas (3)

Last updated on January 16, 2024.