

Ramiz A. Qudsi
Curriculum Vitæ

Postdoctoral Associate
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Employment

Center for Space Physics, Boston University
Postdoctoral Associate (August, 2021 – Present)

National Remote Sensing Center, Indian Space Research Organization
Scientist/Engineer “C” (2012 – 2015)

Education

University of Delaware, Newark, DE (August, 2015 – July, 2021)
Doctor of Philosophy in Physics (July, 2021)
Supervisor: Bennett A. Maruca
Dissertation: *On The Interplay Between Microkinetics and Turbulence in Space Plasmas*

Indian Institute of Space Science and Technology, Trivandrum, Kerala (2008 – 2012)
Bachelor of Technology in Physical Sciences (August, 2008 – May, 2012)

Research Activities and Collaborations

PlasmaPy (2020 –)

PlasmaPy is an open source scientific Python ecosystem for plasma physics. I am presently working on developing various two fluid dispersion solver packages for the ecosystem.

The project is funded by NSF/DOE.

The Simultaneous Interplanetary Magnetic Probe Explorer (SIMPEX) (2020 –)

SIMPEX is a mission design concept where we proposed launching of multiple small spacecraft to record the solar magnetic field and reconstruct a full 3-D image of it, using Machine Learning Algorithm, which will help greatly in understanding the nature and type of turbulence in space plasmas. I am working on it as the lead data scientist and the contact point for algorithm development.

More details about the mission can be found [here](#).

PSP and MMS Fest (2018 –)

These were concentrated efforts by the whole plasma physics group at the University of Delaware into data analysis and management and understanding the underlying physics. The two fests focused on two different spacecraft, MMS and PSP, and resulted in multiple peer reviewed publications, two of which have me as the first author. See **Peer-Reviewed Publications** for an exhaustive list.

Janus Software (2015 –): Analysis software for ion measurements from the *Wind* spacecraft

I was involved with the development of Janus software and implemented several additional features like measurement of fluctuating moments in solar wind. The source code for Janus can be found [here](#).

This project was funded by NASA (Heliophysics Guest Investigator Program).

Peer-Reviewed Publications

Maruca B. et al. (2021), “MagneToRE: Mapping the 3-D Magnetic Structure of the Solar Wind Using a Large Constellation of Nanosatellites,” *Frontiers in Astronomy and Space Sciences*, [doi:10.3389/fspas.2021.665885](#)

Chasapis, A. et al. (2021), “On the validity of the Taylor Hypothesis in the inner heliosphere as observed by the Parker Solar Probe,” accepted by *The Astrophysical Journal*

Qudsi, R. A. et al. (2020), “Intermittency and Ion Temperature–Anisotropy Instabilities: Simulation and Magnetosheath Observation,” *The Astrophysical Journal*, **895**, 895, 83 [doi:10.3847/1538-4357/ab89ad](#)

Qudsi, R. A. et al. (2020) “Observations of Heating along Intermittent Structures in the Inner Heliosphere from PSP Data,” *The Astrophysical Journal Supplement Series*, **246**, 46, [doi:10.3847/1538-4365/ab5c19](#)

Parashar, T. N. et al. (2020), “Measures of Scale-dependent Alfvénicity in the First PSP Solar Encounter,” *The Astrophysical Journal Supplement Series*, **246**, 58, [doi:10.3847/1538-4365/ab64e6](#)

Huang, J. et al. (2020), “Proton Temperature Anisotropy Variations in Inner Heliosphere Estimated with the First Parker Solar Probe Observations,” **246**, 70, [doi:10.3847/1538-4365/ab74e0](#)

Bandyopadhyay, R. et al. (2020), “Observations of Energetic-particle Population Enhancements along Intermittent Structures near the Sun from the Parker Solar Probe,” *The Astrophysical Journal Supplement Series*, **246**, 61, [doi:10.3847/1538-4365/ab6220](#)

Bandyopadhyay, R. et al. (2020), “Enhanced Energy Transfer Rate in Solar Wind Turbulence Observed near the Sun from Parker Solar Probe,” *The Astrophysical Journal Supplement Series*, **246**, 48, [doi:10.3847/1538-4365/ab5dae](#)

Chhiber, R. et al., (2020), “Clustering of Intermittent Magnetic and Flow Structures near Parker Solar Probe’s First Perihelion—A Partial-variance-of-increments Analysis,” *The Astrophysical Journal Supplement Series*, **246**, 31, [doi:10.3847/1538-4365/ab53d2](https://doi.org/10.3847/1538-4365/ab53d2)

Gary, S. P. et al. (2020), “Particle-in-cell Simulations of Decaying Plasma Turbulence: Linear Instabilities versus Nonlinear Processes in 3D and 2.5D Approximations,” *The Astrophysical Journal*, **901**, 160, [doi:10.3847/1538-4357/abb2ac](https://doi.org/10.3847/1538-4357/abb2ac)

Upcoming Publications

Bandyopadhyay, R., Qudsi, R. A, et al., “Interplay of Turbulence and Proton-Microinstability Growth in Space Plasmas,” Submitted to: PRL, under review, <https://arxiv.org/abs/2006.10316>

Qudsi, R. A, et al., “Magnetic Field Topology Reconstruction Using Gaussian Process Regression in Machine Learning,” in preparation

Qudsi, R. A, et al., “Co-existence of Kinetic Instabilities and Turbulence in Space Plasma and Simulation,” in preparation

Invited Presentations

“A Statistical Comparison Between Proton Microinstabilities and Nonlinear Effects in Space Plasmas,” seminar presentation, Mullard Space Science Laboratory (MSSL), University College London, United Kingdom (November, 2019)

“Intermittent Distribution of Ion Temperature-Anisotropy Microinstabilities in the Terrestrial Magnetosheath,” Weekly seminar series, Physics and Astronomy Graduate Student Society, University of Delaware (October, 2019)

“Temperature Enhancements Coincident with Intermittent Structures,” student talk, Laboratory for Atmospheric and Space Physics (August, 2019)

Skill sets

Coding Proficiency: Python, Matlab

Data Analysis: Spacecraft and Simulation data

Language Proficiency: English, Hindi, Urdu, Maithli, Arabic (beginner)

Social: President and founder of Astronomy Club (Undergrad)
Vice-President (2019, 2016) and Treasurer (2015) for the Indian Graduate Student Association