

Manuel E. Cuesta

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EDUCATION

University of Delaware, Newark, DE

Doctor of Philosophy, Physics (*Expected Graduation: May 2023*)

- Proposed Thesis: “Radial Evolution of Turbulence and Intermittency in the Expanding Solar Wind”
- GPA Current: 3.58/4.0

Master of Science, Physics (*August 2020*)

- Thesis: “Voyager 1: Cleaning Magnetic Field Data for Turbulence Studies”
- GPA: 3.39/4.0

Bachelor of Science, Physics (*May 2018*)

- Concentration: Astronomy/Astrophysics, Minors: Mathematics, Computer Science, Electrical and Computer Engineering
- GPA: 3.43/4.0, Dean’s List (*Fall 2014 – Spring 2016, Spring 2017 – Spring 2018*)

RESEARCH EXPERIENCE

University of Delaware Department of Physics and Astronomy, Newark, DE

Graduate Research Assistant, *Advisor: Dr. William Matthaeus (May 2018 – Present)*

Published Works:

- Cuesta, Manuel Enrique, et al. “Isotropization and Evolution of Energy-containing Eddies in the Solar Wind: Parker Solar Probe, Helios 1, ACE, WIND, and Voyager 1.” *The Astrophysical Journal Letters* 932.1 (2022): L11.
- Cuesta, Manuel Enrique, et al. "Intermittency in the Expanding Solar Wind: Observations from Parker Solar Probe (0.16 au), Helios 1 (0.3–1 au), and Voyager 1 (1–10 au)." *The Astrophysical Journal Supplement Series* 259.1 (2022): L23.
- Yang, Yan, et al. “Quantifying Agyrotropy of Proton and Electron Heating in Turbulent Plasmas.” *The Astrophysical Journal* – Accepted.
- Wang, Yanwen, et al. "Strategies for determining the cascade rate in MHD turbulence: isotropy, anisotropy, and spacecraft sampling." *The Astrophysical Journal* 937.2 (2022): L76.
- Sioulas, Nikos, et al. "Magnetic field intermittency in the solar wind: PSP and SoLO observations ranging from the Alfvén region out to 1 AU." *The Astrophysical Journal* 934.2 (2022): L143.
- Sioulas, Nikos, et al. "Statistical Analysis of Intermittency and its Association with Proton Heating in the Near-Sun Environment." *The Astrophysical Journal* 927.2 (2022): L140.
- T. N. Parashar, M. E. Cuesta, and W. H. Matthaeus. “Reynolds Number and Intermittency in the Expanding Solar Wind: Predictions Based on Voyager Observations.” *The Astrophysical Journal Letters* 884.2 (2019): L57.

Ongoing Works:

- Cuesta, Manuel Enrique, et al. “A Study of Compressibility: Comparisons between Parker Solar Probe Observations and 3D MHD Simulations.” – in preparation
- Cuesta, Manuel Enrique, et al. “A Statistical Study of Magnetic Field-Line Curvature using MMS Observations” – in preparation
- Pecora, Francesco, et al. "Relaxation of the turbulent magnetosheath." *arXiv preprint arXiv:2302.00634* (2023).
- Cuesta, Manuel Enrique, et al. “Radial Evolution of Intermittency Parameters as Observed by Parker Solar Probe”
- Cuesta, Manuel Enrique, et al. “Extrapolation of Kurtosis to Unresolved Scales in Spacecraft Measurements and Applications”

Graduate Teaching Assistant (*August 2018 – May 2019*)

Course: Introduction to Physics II (PHYS202)

- Taught, managed, and graded lab sections for topics including optics, electricity, magnetism, and circuitry.

McNair Scholar, DESG Scholar, *Mentor: Dr. William Matthaeus (January 2016 – May 2018)*

Research Assistant, Supervisor/ Project Title: Magnetic Structures in the Solar Wind

- Perform data analysis and manipulation in Python and Fortran languages on magnetic field measurements recorded by the Voyager 1 spacecraft.
- Constructed preliminary research paper detailing observations and results, in addition to explanation for data correlations.
- Experienced with extensive data cleaning techniques, including manual selection and Hampel filter.

Discovery Learning Research Seminar, *Mentor: Dr. John Clem (January 2016 - May 2016)*

Research Assistant

- Informational research into the NM64 type neutron monitor for detecting incident cosmic rays.
- Researching into robotics and python programming for gathering neutron monitor data firsthand and interpreting the data through an applet.
- Constructed and soldered circuit board for signaling specific frequencies to be used during monitoring flight.

CONFERENCES/PRESENTATIONS

Arcetri Workshop on Plasma Astrophysics (*November 2022*)

- Isotropization and Evolution of Energy-containing Eddies in the Solar Wind: Parker Solar Probe, Helios 1, ACE, WIND, and Voyager 1 at Florence, Italy

Solar Heliospheric and Interplanetary Environment (*August 2019, June 2022*)

- A Statistical Study of Magnetic-field Line Curvature Observed by Magnetospheric Multiscale (Poster) at Honolulu, HI
- Intermittency in the Expanding Solar Wind: Observations from Helios 1 (0.3 – 1au), and Voyager 1 (1 – 10 au) (Poster) at Boulder, CO

American Geophysical Union Fall Meeting (*December 2017-2021*)

- Intermittency in the Expanding Solar Wind: Observations from Parker Solar Probe (0.16au), Helios 1 (0.3 – 1au), and Voyager 1 (1 – 10 au); Poster/Oral at New Orleans, LA, San Francisco, CA, and Washington, D.C.

McNair Scholar Summer 2017 Research Symposium (*August 2017*)

- Magnetic Structures in the Solar Wind (Poster) at University of Delaware, Newark, DE

NASA Summer Grant Symposium at University of Delaware (*April 2017*)

- Magnetic Structures in Solar Wind (Poster) in University of Delaware, Newark, DE

NASA Summer Grant Conference (*March 2017*)

- Magnetic Structures in Solar Wind (Poster) at Westin Crystal City Hotel, Arlington, VA

NASA Mid-Atlantic Conference (*September 2016*)

- Magnetic Structures in Solar Wind (Oral) at Johns Hopkins University, Baltimore, MD

HONORS/AWARDS

NASA Undergraduate Tuition Grant (*Fall 2016 – Present*)

Lenfest Scholar Foundation Award (*April 2013 – Present*)

John Preiss Membership Award for Physics Majors (*Fall 2015 – May 2018*)

Ethnic Student of Distinction Recognition (*October 2015, 2016*)

Eagle Scout Award (*April 2014*)

ACTIVITIES/INVOLVEMENT

NASA Summer Research Grant (*Summer 2016 – Present*)

McNair Scholars Program (*Summer 2017 – Present*)

Secretary of the Society of Physics Students (*Fall 2017 – Present*)

Volleyball/Soccer Intramurals (*Fall 2014 – Present*)

Founder/President of Physics Club at Chambersburg Area Senior High School (*Fall 2013 - Spring 2014*)

ASSOCIATIONS AND AFFILIATIONS

Member of the American Geophysical Union (*January 2017 – Present*)

Secretary of the University of Delaware Society of Physics Students (*Fall 2015 – Present*)

Member of the National Society for Collegiate Scholars (*January 2015 – Present*)

National Honors Society (*August 2012 - June 2014*)

Mu Alpha Theta (*August 2011 - June 2014*)

Chemistry Club (*August 2013 - June 2014*)

National Society of High School Scholars (*August 2012 - June 2014*)

SKILLS

Programming Languages: Fluent in Python, Fortran. Familiar with Matlab, Mathematica, Javascript and C+.

Verbal Language: Intermediate written and spoken Spanish.

References

Dr. William Matthaeus (Research Mentor), whm@udel.edu

Dr. Tulasi Parashar (Research Mentor), tulasi.parashar@vuw.ac.nz

Dr. Michael Shay (Physics Professor), shay@udel.edu

Dr. Bennet Maruca (Physics Professor), bmaruca@udel.edu

Dr. James MacDonald (Physics Professor), jimmacd@udel.edu