Matthew C. Pharr

matthew.pharr@columbia.edu
(410) 375-9882

EDUCATION

Columbia University, New York, NY
Ph.D. Plasma Physics, Expected 2026
M.Phil. Plasma Physics, Expected 2025
M.S. Applied Physics, 2023

Rensselaer Polytechnic Institute, Troy, NY
B.S. Physics & Mathematics, 2021
Summa Cum Laude.

PUBLICATIONS, TALKS, AND PROCEEDINGS

Pharr M, Paz-Soldan C, Park J, Logan N, Gribov Y, Leuthold N. *Error field source identification in early ITER plasmas.* American Physical Society, Division of Plasma Physics 2022 Annual Meeting: Spokane, Wa. Section PP11.00044: Poster Session VI: Diagnostics; Edge and Pedestal; Stability; Heating; Transport, Turbulence.

Pharr M, Ebrahimi F. *Magneto-Curvature Instability in Hall-MHD plasmas.* Draft in Progress, 2023.

Pharr M, Ebrahimi F. *Modeling Nonaxisymmetric Magneto-Curvature Instability in Taylor-Couette Experiments.* Draft in Progress, 2023.

Ebrahimi, F., & Pharr, M. (2022). *A nonlocal magneto-curvature instability in a differentially rotating disk.* The Astrophysical Journal, 936(2), 145. https://doi.org/10.3847/1538-4357/ac892d

Pharr M, Ebrahimi F, Blackman E. *Large Scale Magnetic Field Growth and Stability in Hall-MHD Simulations of Quasi-Keplerian Flows.* American Physical Society, Division of Plasma Physics 2021 Annual Meeting: Pittsburgh, PA. Section BO06.00003: Astrophysical Turbulence and Dynamos.

RESEARCH

Graduate Research Assistant May 2021 - Present
Columbia University Plasma Physics Lab, New York, NY
Supervisor: Dr. Carlos Paz-Soldan

- Investigate error field correction schemes for various toroidal fusion devices.
- Contribute to open source physics code.
- Study linear calculation viability for error field perturbations in NSTX-U.

U.S. Department of Energy Research Intern Fall 2020, Summer 2021
Princeton Plasma Physics Lab, Princeton, NJ
Supervisor: Dr. Fatima Ebrahimi

- Conduct dynamo analysis on Magnetorotational Instability (MRI) using NIMROD.
- Script for PPPL MRI Experiment and model new MHD instability in differentially rotating plasmas (see publications).

Undergraduate Research in Computational Molecular Biophysics Summer 2020, Spring 2021
Rensselaer Polytechnic Institute, Department of Mathematical Sciences, Troy, NY
Supervisor: Dr. Peter Kramer

- Implement Gillespie algorithm simulations for various models in python.

PEDAGOGY

Graduate Teaching Assistant, Intro Physics Lab Sequence August 2022 - Present
Barnard College, Physics and Astronomy, New York, NY

Graduate Teaching Assistant, Complex Analysis/Linear Algebra Fall 2021 - May 2022
Columbia University, Applied Physics and Applied Mathematics, New York, NY

Undergraduate Facilitator Fall 2019 - Summer 2020, Spring 2021
Rensselaer Polytechnic Institute, Physics Department, Troy, NY

- Facilitate Honors Physics I/II Lab, Electromagnetic Theory, Intro to Quantum Mech.

I-PERSIST Mentor Fall 2019
Rensselaer Polytechnic Institute, Physics Department, Troy, NY

ALAC Introductory Physics Tutor Fall 2019 - Spring 2020
Rensselaer Polytechnic Institute, Physics Department, Troy, NY

Private Tutor, Math/Physics Spring 2018 - Spring 2020
Self-employed.

HONORS AND AWARDS

Rensselaer Polytechnic Institute

Max Hirsch Prize in Mathematics
This prize is awarded to a Senior in the Department of Mathematical Sciences who has demonstrated outstanding ability in his or her academic work and also gives promise of outstanding success in a career in mathematical sciences.

J. Lawrence and Gertrude Katz Award in Physics
This award is presented to the student selected as the outstanding graduating senior receiving a Bachelor of Science in Physics.

ΣΠΣ, Physics Honor Society
Rensselaer Archimedian Society (4.0 award)
Honorable Mention for Research Paper, Mathematical Competition in Modeling
Rensselaer Leadership Award

SKILLS

Python, Java, Fortran, Matlab, Linux, LaTeX
Use of vacuum technology and other plasma physics related lab equipment
Use of high voltage lab equipment
Conversational in French

HOBBIES

Hiking; Bouldering; Media Studies; Green, Queer, and Student Activism