

Himawan Wicaksono Winarto

Education

- 2018–now **Ph.D. Candidate**, *Princeton University*, Plasma Physics
2014–2018 **A.B.**, *Princeton University*, Physics, High Honor
Thesis: Laboratory Study of Magnetorotational Instability.

Experience

- 2020–now **Ph.D. Candidate**, *Prof. Matthew Kunz Group*
- Investigating the influence of kinetic plasma instabilities on electrical resistivity, aiming to incorporate kinetic effects into fluid-like simulations and to improve the turbulence scaling.
 - Conducted hybrid simulations to analyze the interaction between Tearing and Mirror Instabilities in a compressing current sheet.
 - Developed an automated algorithm for saddle point detection as detailed in Winarto & Kunz (2021).
- 2021–2023 **Graduate Teaching Assistant**, *Princeton University*
- AST 552 (S2023) *General Plasma Physics II*
Helping to rewrite the lecture notes into textbook draft.
 - APC 523 (S2021, S2022) *Numerical Algorithms for Scientific Computing*
APC 524 (F2021, F2022) *Software Engineering for Scientific Computing*
 - Developed a significant portion of the homework assignments, covering topics such as algorithm implementation, error analysis, and the proficient use of scientific parallelization libraries and version control systems.
 - Assessed and graded students' final projects across various fields of study.
 - PHY 503, 504, 513, 514 (F2022) *Physics Qualifying Exam Problem Solving Courses*
- 2017–2020 **Research Assistant**, *Princeton Magnetorotational Instability Experiment*
- Proposed a new measurement method that demonstrated a high correlation with the instability based on a large number of simulations across the parameter space. This method was initially presented in my undergraduate thesis (2018) and later published in Winarto et al. (2020).
 - The same measurement method was used to conclusively validate the presence of instability within the experiment as reported in Wang et al. (2022a, 2022b).
- Summer 2016, 2017 **Exchange Student**, *University of Tokyo*
Worked with Prof. Masahiro Hoshino in two plasma physics computational projects:
- Developed a test-particle code to investigate relativistic quasilinear wave-particle diffusion theory.
 - Conducted simulations of the stratified Magnetorotational Instability in a disk using a modified Magnetohydrodynamics code with anisotropic pressure closure.
- 2015–2016 **Laboratory Assistant**, *Michael Romalis Group - Princeton University*
- Designed, machined, and tested an active magnetic shielding and cell chamber for a multiyear experiment campaign.
 - Developed control software and assembled the hardware for the experiment, which was subsequently published in Almasi et al. (2020).

Organizational Activity

- 2020–now **PERMIAS Nasional**, *Organization of the Indonesian Students in the United States*
Current: President (2023–now)
Past: Director of Academic (2022–2023); Co-Director of Academic, Research, and Professional Development (2021–2022); Co-Director of Academic and Research (2020–2021)
- Leading the national assembly of Indonesian students in the US overseeing more than 8000 students across 106 chapters.
 - Collaborating closely with the Indonesian government representatives in the US and prominent companies from both the US and Indonesia.
 - Organized and led educational colloquiums to highlight Indonesian scholars and educational opportunities in the US.

- 2018–now **Program in Plasma Physics Graduate Student Committee**
Current: Class Representative (2018–now)
Past: Vice Chair (2021–2022); Graduate Student Government representative (2022–2023)
- 2014–2018 **Princeton Society of Physics Students (PSPS)**
President (2017–2018); Treasurer (2015–2016)

Publications

1. Wang, Y., Gilson, E.P., Ebrahimi, F., Goodman, J., Caspary, K.J., **Winarto, H.W.** and Ji, H., 2022, *Nature Communications*, 13(1), pp.1-10.
Identification of a non-axisymmetric mode in laboratory experiments searching for standard magnetorotational instability.
2. **Winarto, H.W.** and Kunz, M.W., 2021, *Journal of Plasma Physics*, 88(2).
Triggering tearing in a forming current sheet with the mirror instability.
3. **Winarto, H.W.**, Ji, H., Goodman, J., Ebrahimi, F., Gilson, E.P. and Wang, Y., 2020, *Physical Review E*, 102(2), p.023113.
Parameter space mapping of the Princeton magnetorotational instability experiment.
4. Almasi, A., Lee, J., **Winarto, H.**, Smiciklas, M. and Romalis, M.V., 2020, *Physical Review Letters*, 125(20), p.201802.
New limits on anomalous spin-spin interactions.

Talks and Posters

- 2023 **BRIN HPC Workshop**, Serpong, Indonesia, Workshop
- Collaborated with Indonesia's National Research and Innovation Agency (BRIN) to organize a two-day workshop on the use of High Performance Computing (HPC) tools.
 - Taught seven sessions covering various topics, from plotting to MPI (Message Passing Interface).
 - Translated materials into the Indonesian language for the [course website](#).
 - Funded by the Overseas Travel Grant from the American Indonesian Cultural & Educational Foundation.
- 2022 **64th APS DPP Annual Meeting**, Spokane, WA, USA, Contributed Talk
Electrical Resistivity of Collisionless, High-Beta Plasmas
- 2021 **63rd APS DPP Annual Meeting**, Pittsburgh, PA, USA, Contributed Talk
Tearing, Reconnection, and Anomalous Resistivity in a Mirror-infested Plasma
- 2020 **62nd APS DPP Annual Meeting**, Online, Contributed Talk
Tearing and Reconnection in a Mirror-infested Current Sheet
- 2019 **61st APS DPP Annual Meeting**, Ft. Lauderdale, FL, USA, Contributed Poster
Isolating Magnetorotational Instability (MRI) Using Eigenmode Analysis in the Numerical Simulation of Princeton MRI Experiment
- 2018 **60th APS DPP Annual Meeting**, Portland, OR, USA, Contributed Talk
Numerical Prediction of Magnetorotational Instability in Magnetized Taylor-Couette Flow with Conducting Endcaps
- 2017 **7th Asian Physics Symposium**, Bandung, Indonesia, Contributed Talk
Progresses on Magnetorotational Instability

Achievements

- 2023 **Overseas Travel Grant**
American-Indonesian Cultural & Educational Foundation
- 2018 **Phi Beta Kappa Society**
- 2018 **Allen G. Shenstone Prize in Physics**
- 2016, 2017 **Kusaka Memorial Prize in Physics**
Received the award twice.
- 2015 **Manfred Pyka Memorial Prize in Physics**
- 2013 **Absolute Winner in 14th Asian Physics Olympiad**
Gold medal and Best Experimental Result with the highest total score out of all participants.

2013 **Outstanding Achievements in Technology**

Indonesian Ministry of State Enterprise Awards

2013 **Taruna Merah Putih Award for Prolific Youth in Education**

Partai Demokrasi Indonesia-Perjuangan

Proficiency

Language English, Bahasa Indonesia, Japanese (*JLPT N3*)

Programming C/C++, FORTRAN, Python, Bash, Mathematica, Labview, MATLAB

Tools OpenMPI, OpenMP, CMake, Git, Docker, CI/CD, OpenACC