Wisha Wanichwecharungruang

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Education

Rice University, Houston, TX   2021 – present
B.S. in Physics   Exp. Graduation 2025
B.A. in Computer Science
GPA: 3.96/4.00 (6 semesters completed)

Research Publications

1. Jain, M., Amin, M. A., Thomas, J., **Wanichwecharungruang W.** (2023). *Kinetic relaxation and Bose-star formation in multicomponent dark matter*. Physics Review D (Vol. 108, Issue 4) 10.1103/PhysRevD.108.043535
2. Jain, M., **Wanichwecharungruang W.**, Thomas, J. (2024). *Kinetic relaxation and nucleation of Bose stars in self-interacting wave dark matter*. Physics Review D (Vol. 109, Issue 1) 10.1103/PhysRevD.109.016002

Honors & Awards

Summer Undergraduate Research Fellowship fund   2022, 2024
for Summer research in Physics & Astronomy at Rice University   (won twice)

Louise J. Walsh Scholarship in Engineering   2023
top academically performing students in the George R. Brown School of Engineering

Bonner Book Award (from Rice U. Dept. of Physics & Astronomy)   2023, 2024
awarded annually to 2 Physics & Astronomy student in each year class   (won twice)

First Prize at the *Rice Datathon* data science hackathon   2023
awarded to the overall best team (of 4 people) out of over 200 participants

Outstanding Undergraduate Student Oral Presentation   2022
at the Texas Section of the APS and AAPT (TS-APS) Fall 2022 Meeting

Research Experiences

Cosmology & Astroparticle Physics Group at Rice University   2022 - present
Advisors: Mustafa A. Amin, Mudit Jain
Program: Summer Undergraduate Research Fellowship (2022)

- Investigated formation of Bose stars from Ultralight Dark Matter (ULDM) with multiple components and with point-like self-interaction.
- Implemented and optimized numerical simulations of ULDM based on existing code in Python and MATLAB.
- Analyzed soliton formation process and formation time dependence on ULDM components, self-interaction, initial distribution, etc.

Yi Group at Rice University   2024
Advisors: Ming Yi
Program: Summer Undergraduate Research Fellowship (2024)

- Analyzed data from X-Ray diffraction measurement of the van der Waals ferromagnet Fe_5GeTe_2 to understand how temperature cycling affects the material's crystal and electronic structures.
- Implemented a Python X-Ray diffraction data processing pipeline (cell refinement, hkl-indexing, symmetrization) that – unlike the existing pipeline – does not require a high-performance computing cluster to run.
- Leveraged machine learning and clustering techniques to empirically track X-Ray diffraction peaks evolution.

Academia Sinica Institute for Astronomy and Astrophysics   2024
Advisors: Kuan-Chou Hou, Yu-Hsuan Hwang, Kuo-Song Wang, Chin-Fei Lee
Program: Summer Student Program (remote, part-time participation)

- Developed machine learning models for detection of astronomical sources in images based on the YOLO architecture, achieving 83% detection rate with training & testing data from the SDSS catalog.
- Model is currently being integrated into CARTA (Cube Analysis and Rendering Tool for Astronomy) software.

Other Experiences

Software Development Summer Intern · Geckotech · Almere, the Netherlands   2023

- Designed and implemented the Rust [Async UI](#) HTML UI framework with a novel UI-as-side-effect concept.
- Made [X-Bow](#), a diff-free Rust state management library based on "lenses".
- Used Async UI and X-Bow to build a GUI application for data exploration/analysis based on *polars* dataframes.

Grader · Rice University Mathematics Department   2022 - present

- Graded calculations and proofs homework for Calculus (Fall 2022) and Linear Algebra (Spring & Fall 2023).