BRYCE HOBBS

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ABOUT ME

Citizenship: United States

Research Interests: Laboratory Astrophysics, White Dwarfs, Radiative Properties

EDUCATION

P.h.D. — **The University of Texas at Austin**
Current — Astronomy
Advisor: Don Winget, Thomas Gomez

Bachelor of Science — **The University of Texas at Austin**
May 2020 — Physics, Astronomy

RESEARCH PROJECTS

The NIF Oxygen Opacity Campaign Oct. 2022 - Present

Developing a data reduction and analysis pipeline for the Oxygen Opacity Campaign on the Lawrence Livermore National Laboratory National Ignition Facility. By measuring the opacity of oxygen at conditions near the Sun's convection zone boundary (CZB), we can investigate a potential cause of the "solar problem" that solar models' CZB locations are discrepant with helioseismic measurements.
Advisors: Thomas Gomez, Don Winget

Atomic Line Shape Calculations Relevant to Hot DQ White Dwarfs May 2022 - Present

Increasing the capabilities of the Xenomorph Stark-broadened atomic line shape code to simulate ionized carbon at the conditions found in hot DQ WD atmospheres.
Advisors: Thomas Gomez, Don Winget

The White Dwarf Photosphere Experiment Jun. 2020 - May 2022

Analyzing data from the White Dwarf Photosphere Experiment (WDPE) on the Sandia National Laboratories Z Machine. Focus includes investigating temperature and electron number density estimates through spectral fitting techniques on hydrogen, helium, and carbon plasma. The platform is well suited to verify new atomic line shapes incorporated into synthetic spectra for white dwarf star parameter estimation.
Advisors: Don Winget, Mike Montgomery

PRESENTATIONS AND POSTERS

Hobbs, B., Mar. 20, 2024, "Development of Improved Higher-Order Correction for the NIF Oxygen Opacity Experiments," Presentation, Stars/Planets/ISM Seminar, The University of Texas at Austin, Austin, TX

Hobbs, B., Gomez, T., Mayes, D., Berbel, Z., Heeter, B., Montgomery, M., White, J., Winget, D., Feb. 21-22, 2024, "Progress Toward Atomic Line Shape Calculations for Ionized Plasmas on the NIF Opacity Campaign," Poster, Stewardship Science Academic Programs, Arlington, VA

Hobbs, B., Mayes, D., Winget, D., Montgomery, M., Jan. 30, 2024, "Progress on the NIF Oxygen Opacity Campaign: Higher-Order Corrections," Poster, NIF User Group Meeting, Livermore, CA

Hobbs, B., Gomez, T., Montgomery, M., Winget, D., Aug. 9-11, 2023, "New Singly-Ionized Carbon Line Shapes for the White Dwarf Photosphere Experiment," Poster, Z Fundamental Science Workshop, Albuquerque, NM

Hobbs, B., Jun. 8, 2023, "New CII Spectral Line Shapes for Fitting Hot DQ White Dwarf Stars," Poster, AAS 242, Albuquerque, NM

Hobbs, B., May 10, 2023, "New Spectral Line Shapes for Fitting Non-DA White Dwarfs," Defense Presentation, The University of Texas at Austin, Austin, TX

Hobbs, B., Mayes, D., Winget, D., Montgomery, M., Feb. 22, 2023, "A Data Reduction Pipeline for the NIF Oxygen Opacity Experiments," Poster, NIF User Group Meeting, Livermore, CA

Hobbs, B., Gomez, T., Winget, D., Montgomery, M., Feb. 14-15, 2023, "Incorporating Hyperbolic Trajectories into the Xenomorph Line Shape Code," Poster, Stewardship Science Academic Programs, Santa Fe, NM

Hobbs, B., Gomez, T., Berbel, Z., Montgomery, M., Winget, D., Aug. 15-19, 2022, "Incorporating Xenomorph Hydrogen Line Shapes into White Dwarf Model Spectra," Poster, EuroWD23 Workshop, Tübingen, Germany

PUBLICATIONS

B. A. Hobbs, D. C. Mayes, R. F. Heeter, P. Bradley, E. C. Dutra, C. J. Fontes, E. Gallardo-Diaz, M. Hohenberger, H. Johns, K. Opachich, H. Robey, S. Stoupin, M. S. Wallace, L. G. Webster, T. S. Perry, and D. E. Winget, "Development of Improved Higher-Order Correction for the NIF Opacity Spectrometer," Review of Scientific Instruments (In Preparation)

Cho, P. B., Gomez, T. A., Montgomery, M. H., Dunlap, B. H., Fitz Axen, M., **Hobbs, B.**, Hubeny, I., Winget, D. E., "Simulation of Stark-broadened Hydrogen Balmer-line Shapes for DA White Dwarf Synthetic Spectra", ApJ, 927, 70 (2022)

TEACHING EXPERIENCE

Independent Study Mentor Spring 2022 - Present
Project: WDPE *Advisor: Dr. Mike Montgomery*

Mentoring an undergraduate student working on the White Dwarf Photosphere Experiment (WDPE). He is investigating a discrepancy in the absorption versus emission spectral line in the helium WDPE data. This involves weekly meetings to discuss research directions, work on Python coding skills, and focus toward catering the work toward his career trajectory.

Research Group Mentor Fall 2021 - Present
Course: Freshman Research Initiative *Professor: Dr. Mike Montgomery*

Mentoring the research projects of several groups of first and second year undergraduate students. Presenting background on the projects to the groups. Preparing python scripts for students to exercise their coding skills while they perform real research.

Teaching Assistant Fall 2023
Course: Astrophysics *Professor: Dr. Pawan Kumar*

Held office hours weekly to help students with homework questions and class comprehension. Attended lectures to aid in demos and quizzes. Graded student homework, papers, and exams. Organized and managed the course web page.

REFERENCES

Don Winget	The University of Texas at Austin	dew@astro.as.utexas.edu
Mike Montgomery	The University of Texas at Austin	mikemon@astro.as.utexas.edu
Thomas Gomez	The University of Colorado, Boulder	Thomas.Gomez@colorado.edu