

# Brady Elster

✉ [belster@auburn.edu](mailto:belster@auburn.edu) | [LinkedIn Profile](#) | [Github Profile](#)

## EDUCATION

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### Auburn University

*Doctor of Philosophy in Physics*

*Master of Science in Physics*

Auburn, AL

May 2024 – Present

Aug. 2022 – May 2024

### Ithaca College

*Bachelor of Science in Physics, Minor in Mathematics*

Ithaca, NY

Aug. 2018 – May 2022

## EXPERIENCE

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### Graduate Research Assistant

*Auburn University*

June 2020 – Present

*Auburn, AL*

- Conducting research on the stability of linear tearing modes in plasma, focusing on two-fluid effects
- Acquiring and applying advanced knowledge in numerical methods for solving stiff differential equations and eigenvalue problems
- Developing a computational code that integrates discretization and shooting methods to solve stiff eigenvalue differential equations

### Graduate Teaching Assistant

*Auburn University*

Aug. 2022 – May 2024

*Auburn, AL*

- Instructed the laboratory sections of introductory algebra and calculus-based physics courses
- Designed a semester-long curriculum of student activities informed by evidence-based physics education research
- Provided weekly tutoring to introductory physics students in the department's *Physics Resource Room*

### Undergraduate Research Assistant

*Ithaca College*

June 2020 – May 2022

*Ithaca, NY*

- Examined and characterized the stellar spectra of select Herbig Ae/Be stars in the Small Magellanic Cloud (SMC)
- Measured stellar temperatures from spectral data using curve fitting tools in Python
- Identified a relationship between accretion luminosity and Balmer Jump discontinuity using data denoising and interpolation techniques

## PROJECTS

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### TwoFluidTearing.jl | *Julia, Git*

January 2023 – Present

- Currently developing an open-source Julia code to solve reduced-MHD equations in periodic slab geometry
- Utilized a combination of matrix eigenvalue and shooting methods for efficient solving
- Implemented parallel programming techniques in many functions to improve performance and extend the functionality and generalizability of the code
- Currently benchmarking the code against theoretical predictions to check the reliability of the solutions

### SMCpdp.py | *Python, Git*

June 2020 – May 2022

- Contributed essential Python code for stellar temperature calculation
- Measured differences in stellar atmosphere models compared to experimental spectral data
- Created an algorithm to read data files, denoise and smooth data, and take numerical measurements

## TECHNICAL SKILLS

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**Languages:** Julia, Python, FORTRAN, R, Mojo

**Software:** Git, VSCode, MATLAB, Mathematica

**Libraries:** PyTorch, NumPy, Matplotlib, SciPy, AstroPy, pandas, Makie, chebfun, ggplot

**Frameworks:** Dedalus (Python), SciML (Julia)

## PLASMA PHYSICS COURSEWORK

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**Survey of Plasma Physics:** graduate elective covering definition of a plasma, single-particle motion, basic MHD

**Plasma Waves:** graduate elective covering Landau damping, waves in cold/warm plasma, magnetosonic & Alfvén waves

**Plasma Material Interactions:** graduate elective on tokamak scrape-off layer physics: divertors/limiters, sputtering