Zhengzhan Shang

Depatment of Astro- and Geophysics, Institute of Physics, University of Graz | Nationality: Chinese

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About

I am a PhD candidate in solar physics. My research area is Rossby waves in solar interior. I hold a master's degree in physics with a specialization in computational fluid dynamics. Between September 2024 and April 2025, I was enrolled at the Institut für Interkulturelle Kommunikation (IIK) in Göttingen to obtain my German-language C1 certificate.

Skills

- Python | Dedalus | LaTeX | SageMath | WolframAlpha | Mathematica | ParaView | HPC (High-performance Computing) | MobaXterm | Microsoft Office
- Unix - [Linux, OSX, Windows]
- English - Professional Proficiency | German - C1 | Mandarin Chinese - Native

Education

Ph.D Physics	**University of Graz**, Graz, Austria	July. 2025 – July. 2028

- Planned title of Doctoral thesis : "Rossby Waves in Dynamo Layers of Sun-Like Stars" (Research Group: Prof. Dr. Astrid Veronig; Co-supervisor: Dr. Teimuraz Zaqarashvili)

M.Sc. Physics	**University of Göttingen**, Göttingen, Germany	Oct. 2020 – Sept. 2024

- Final Grade: 2,0/1,0 (good)
- Coursework: [Numerical fluid dynamics], [Advanced Statistical Physics], [Classical-Quantum Connections in Theoretical Physics], [String Theory], [Advanced Lab Course]
- Master's Thesis: "Numerical Evaluation of Kolmogorov's Theory of Turbulence in Rotating Ellipsoid" (Research Group: Prof. Dr. Andreas Tilgner)

B.Sc. Mathematics & Physics	**University of Wisconsin-Stevens Point** (UWSP), Stevens Point, WI, USA	Sept. 2016 – May 2020

- Minor: Astronomy
- GPA: 3.16/4.0 (good)
- Coursework: [Calculus I-III], [Intro to Linear Algebra], [Intro to Proof], [Differential Equation], [Mathematical Analysis], [Abstract Algebra-Rings and Fields], [Complex Variables], [Game Theory], [University Physics I&II], [Modern Physics], [Astrophysics], [Thermodynamics & Stat Mechanics], [Computational Physics], [Advanced Mechanics], [E&M], [Quantum Mechanics], [Experimental Physics]

Experience

Student Internship	Research Group: Prof. Dr. Laurent Gizon, Co-supervisor: Dr. Damien Fournier, **Max Planck Institute for Solar System Research**, Göttingen, Germany	Sept. 2022 - Jun. 2023

- Reproduction of the paper by Tang (1979), "Comparison of Spectral Methods for Flows on Spheres"
- Investigation of two-dimensional flow on a spherical surface using the full-spectral method
- Implementation of a full-spectral method in Python

Research Assistant	Research Group: Prof. Dr. Mick Veum, **Department of Physics and Astronomy**, UWSP, WI, USA	Sept. 2017 - Feb. 2020

- Data acquisition and analysis using Microsoft Office for the following experiments:
  - measuring the temperature variation of film tension in freestanding liquid-crystal films
  - measuring the contact angle of water droplets on hydrophobic soils
- Designing and implementing improvements to the experimental apparatus and data acquisition techniques

Research Assistant in Astrophysics	Research Group: Prof. Dr. Sebastian Zamfir, **Department of Physics and Astronomy**, UWSP, WI, USA	Sept. 2017 - Jun. 2018

- Data collection from the SDSS SkyServer and categorization using Python
- Determination of mutual suppression in the winds and jets of extragalactic quasars

Projects

Tidal Dissipation in Rotating Ellipsoids   github.com/zhengzhanshang/ell_rot_2024, 2024
- Computational fluid dynamics (CFD) simulations of elliptical instability in rotating ellipsoids using Dedalus in a high-performance computing (HPC) environment
- Tools Used: Python, Dedalus, SageMath, LaTeX, WolframAlpha

Full Spectral Method in Spherical Geometry   github.com/zhengzhanshang/mps_internship_2023, 2023
- Coded the full spectral method to solve for the velocity field using finite difference method in spherical geometry
- Tools Used: Python

Advanced Linear Algebra   2020
- Investigating the properties of matrices through their eigenvalues and eigenvectors, and extending these concepts to operators in infinite-dimensional spaces

Poster Presentation   2019
- Title: "The relation between the tension of a freestanding liquid-crystal film and its bulk temperature"

Poster Presentation   2018
- Title: "Winds and Jets Mutual Suppression in Quasars?"

Additional Experience And Honors

Tutor **(2018-2020):** Taught a course at UWSP on mathematics for non-mathematicians, as well as introductory-level physics and mathematics courses for students from diverse backgrounds

Planetarium Presenter **(2019-2020):** Presenter at UWSP's Allen F. Blocher Planetarium. Delivered engaging astronomy shows and demonstrated skill in educating and entertaining diverse audiences

Observatory Operator **(2019-2020):** Operated telescopes and managed observational sessions at UWSP's Arthur J. Pejsa Observatory. Conducted astronomical observations and provided informative guidance to visitors

Math Club Leadership Award **(2020)**	**Department of Mathematical Sciences**, UWSP, WI, USA
Department Leadership Award **(2020)**	**Department of Mathematical Sciences**, UWSP, WI, USA
Distinguished Achievement Award **(2020)**	**College of Letters and Science**, UWSP, WI, USA
Arthur J. Pejsa Aerospace Scholarship **(2019)**	**University of Wisconsin-Stevens Point**, WI, USA

References

Prof. Dr. Andreas Tilgner (master's thesis supervisor):<andreas.tilgner@phys.uni-goettingen.de>

Prof. Dr. Sebastian Zamfir (undergrad research supervisor): <szamfir@uwsp.edu>