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Minjie Lei

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Research Interests

Multi-phase ISM; Galactic magnetism; Dust polarization; Faraday rotation; Astrostatistics

Education

Ph.D., Physics, Stanford University — Sept 2021 – Present
Topic: Physics of the multi-phase interstellar medium with a focus on the structure of the 3D Galactic magnetic field

B.Sc., Physics & Math, University of Michigan — Sept 2016 – June 2020
Undergraduate thesis: "*Probing non-standard neutrino interactions with supernova neutrinos at Hyper-K,*" supervised by James D. Wells

Publications

1. **Minjie Lei**, S. E. Clark, et al., "*Neutral gas phase distribution from HI morphology: phase separation with scattering spectra and variational autoencoders,*" 2025, arXiv:2505.20407, submitted to ApJ
2. **Minjie Lei**, S. E. Clark, "*A New Constraint on the Relative Disorder of Magnetic Fields between Neutral ISM Phases,*" The Astrophysical Journal, vol. 972, no. 1, 2024
3. **Minjie Lei**, S. E. Clark, "*Probing the cold neutral medium through HI emission morphology with the scattering transform,*" The Astrophysical Journal, vol. 947, no. 2, 2023
4. **Minjie Lei**, K. V. Tsang, et al., "*Implicit Neural Representation as a Differentiable Surrogate for Photon Propagation in a Monolithic Neutrino Detector,*" 2022, arXiv e-prints, arXiv:2211.01505
5. **Minjie Lei**, Noah Steinberg, & James D. Wells, "*Probing non-standard neutrino interactions with supernova neutrinos at Hyper-K,*" 2020, JHEP, 01, 179
6. **Minjie Lei**, James D. Wells, "*Minimally modified A_4 Altarelli-Feruglio model for neutrino masses and mixings and its experimental consequences,*" 2020, Phys. Rev. D, 102 (1), 016023

Scientific Presentations

Invited Talks

May 2025	**Astronomy Tea Talk**; Caltech
April 2025	**ITC Luncheon**; Havard CfA
March 2025	**Scattering Club**; ENS Paris
Nov 2024	**Astrominque Series**; Ciela Institute
March 2024	**KIPAC tea**; Stanford University
Jan 2024	**Journal Club**; Pan-Experiment Galactic Science Group
February 2023	**ISM Seminar**; ENS Paris

Contributed Talks

Feb, 2025	**Structure and polarization in the interstellar medium**; Stanford University
Jun. 2024	**AAS 244**; Madison, Wisconsin
July. 2023	**Interstellar Institute 6**; Institut Pascal - Université Paris-Saclay
Dec. 2022	**Galactic Science and CMB Foregrounds**; Core to Core CMB Workshop series

Honours and Awards

2023-2025 **Stanford Graduate Fellowship**, Stanford University
2016-2020 **James B. Angell Scholar**, University of Michigan

Teaching and Mentorship

Teaching Assistantships

Spring 2024 **Computational Physics** (Physics 113)
Fall 2023 **Stars and Planets in a Habitable Universe** (Physics 15)
Winter 2023 **Stars and Planets in a Habitable Universe** (Physics 15)
Fall 2019 **Honors Physics I - Mechanics** (Physics 160)
Fall 2018 **Physics for the Life Sciences I** (Physics 135)

Student Mentorship

2024-present **Caio Gould**, undergraduate at Stanford, Stanford Undergraduate Research Fellowship
2023-2024 **Abraar Saleem**, Stanford postbac scholar, Stanford KIPAC postbac program
2022-2023 **Amritpal Nijjar**, undergraduate at UCLA, Stanford PIE Program
2020-2021 **Jackie Zhao**, High school student, Minds Matter Philadelphia

Service and Outreach

2025 **Booth Leader & Volunteer**; KIPAC Community Day, Stanford University
2025 **Local Organizing Committee**; Conference in Honor of Prof. John Dickey, Stanford University
2024 **Booth Leader & Volunteer**; STEMFest, Stanford University
2023 **Volunteer**; KIPAC Community Day, Stanford University